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RESEARCH - SPRINGBOARD OF PROGRESS

At the lower level, the teacher is expected simply to transmit the existing heritage of knowledge and understanding. He is not expected to add to this heritage himeself. At the higher level, however, the teacher is expected to be a creator, a researcher, as well as transmitter.

Research in the field of education appears to be the most effective method of keeping up with events in our dynamic society. Most modern governments support scientific research as a vital aid to national progress and security. In 1950, the United States created the National Science Foundation "to promote basic research and education in Sciences."

Some of our most spectacular scientific developments have resulted from "happy accidents" rather than from directed procedures for arriving at the truth. During a search for a particular phenomenon something else of equal or greater value was obtained. In the language of research, this is called "Serendipity".

During the latter part of the nineteenth century, rubber made from latex was too brittle to be of much practical use. One day a young scientist. Charles Goodyear was experimenting with a mixture of latex to which he had added some sulphur. By accident he spilled a small quantity into the fire. After having little success with his original experiment, he discovered that the mixture he had spilled into the fire had not burned but would stretch when he pulled it apart. Later, some of Goodyear's samples, cooked as a mixture of rubber, white lead and sulphur found their way to England, where Thomas Han Cock noted the sulfur blooms on them. This prompted him to heat raw rubber in molten sulfur, which effected "Vulcanization" of the rubber. Thus was born the process of hardening rubber by treating it with sulfur at a high temperature. The process was patented in England by Hancock in 1843 and in America by Goodyear in 1844.

The story of the discovery of Penicillin reads like a fairy tale. Alexander Fleming, a scottish bacteriologist, was examining a glass dish containing agar jelly one day in the autumn of 1928. On that jelly he was growing organisms called staphylococci All of a sudden Fleming found in this plate a small fleck of

dark-green mould. He noticed to his utter amazement that spreading mould had the power to kill the deadly germs. This led to the wonder drug penicillin. It was the miracle of a stray mould. Another interesting example of 'a happy accident' is found in the experiments of a British Chemist, Sir William Henry Perkin. He wanted to synthesize quinine and by sheer chance came to discover the firsr synthetic dye (aniline dye) 'royal purple.'

But the question is, could we ever wait for serendipity for human progress? The answer is very clear: We cannot. A University is charged with the responsibility of opening new vistas of knowledge by deliberate, purposeful and sound research. But the job of a university is not over just in producing knowledge. The university should also be instrumental in the dissemination of new knowledge and wisdom.

The present number of the University journal is a humble attempt in this direction. South Gujarat University with 10 post-graduate Departments and 34 affiliated colleges is now in a better position to go ahead with pursuit of excellence. We are sure our readers would appreciate the attempt in spite of certain limitations.

Editors

INDEX

EDUCATIONAL TECHNOLOGY AND SYSTEMS APPROACH

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What Educational Technology Is Not

The term 'educational technology' has been widely used in recent years, but quite often in an imprecise or inconsistent manner. Its manifestations can range from programmed instruction through sophisticated hard ware systems to operational research studies of education systems. The most popular misconception of educational technology finds expression in a belief that it could be equated to hardware or even programmed material. Even as it is the word 'technology,' just doesn't mean 'machines'. It implies the practice, description and terminology of applied sciences of commercial value. The term 'educational technology' needs to be understood in its proper context which is quite broad. The alleged failure of teaching machines, for example, should in no case be taken as failure of educational technology just as failure in power supply owing to short circuit should not mean failure of electricty.

A Comprehensive Definition

Educational technology is generally taken to refer to the application to education of devices, processes and styles of thinking developed outside the realm of education–for example, linear programming, systems analysis, television, compters and other electro-mechanical systems. The British National Council for Educational Technology defines educational technology briefly as 'the development, application and evaluation of systems, techniques and aids to improve the process of human learning. Implicit in the definition is a concern that objectives of instruction should

be laid down at the outset along with the ways of assessing whether these objecetives have been attained. Educational technology is thus concerned as much with the needs of the learner as with those of the teacher. In view of such a broad base of educational technology the Council includes search for improved productivity in education and training. The Council considers effectiveness of learning process as important as efficiency in the management of the process. The Council therefore has a direct interest in the inter-relationship of finance, planning and administration. A natural extension of all these considerations would be a carefully-planned use of the resources available, taking 'resources' in the widest sense to include human, material, architectural, financial and other elements in the design of learning systems for educational purposes.

Systems Analysis

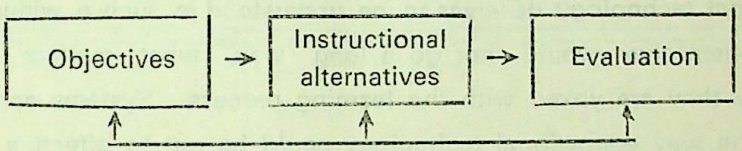
The term 'systems' carries the connotation of analysis and development. Banghart defines a system as "an integrated assembly of interacting elements, designed to carry out cooperatively a predetermined function" (Banghart, 1969). According to Banghart the living organism, the animal, or above all, the human boy with its central nervous system, is an example par excellence of a system. It is a truism that the human body is the primary source of inspiration for our fundamental notions about systems. Simulation helps in making a system more effective. 'Simulate' means to give the appearance or the effect of or to make a pretense of or 'to assume', or to have the appearance of Malcolm defines simulation as "one which depicts the working of a large scale system of men, machines, material and information operating over a period of time in a simulated environment representative of actual real world conditions" (Banghart, 1969) In the field of education micro-teaching provides a good example of simulation and it implies a scaled-down teaching encounter.

Systems Approach For Curriculum Development

It would be a worthwhile exercise to spell out how systems approach could be applied to an aspect of education, say curriculum construction. In curriculum development, systems approach would mean a rational problem-solving method of analyzing the educational process and making it more effective. The system refers to the process taken as a whole incorporating all its parts and aspects, including the students,

the teachers, the content, the instructional materials, the instructional strategy, the physical environment and the evaluation of instructional objectives. Effectiveness of the process would refer to the desired changes in students behaviour and it would be tested accordingly.

Systems approach to curriculum development attempts to maximize educational effectiveness by clarifying educational objectives with great precision and then by redesigning the entire educative process in order to ensure student achievement. Achievement obviously implies moving toward the desired instructional objectives. The diagram below would make the point clear.



An instructional system thus is "an empirically developed set of learning experiences which are designed to achieve, with a given degree of reliability, a given out come for a given class of learners" (Razik, 1972).

Steps To Be Followed

The first step in analyzing a system is to describe as specifically as possible the ultimate goal of the system. The teacher in this situation is an instructional manager who elicits appropriate changes in the behaviour of learners. Cyrs and Lowenthal suggest the following steps for analysing a system (Cyrs, 1970).

1 Gather input data on students
2 Formulate student perfomance objectives
3 Construct pretests
4 Select course content
5 Select the instructional strategy
6 Produce those instructional materials not available commercially
7 Select the instructional process
8 Conduct instruction
9 Analyse post-test
10 Evaluate

Epilogue

Technology, in all its full force, would be applied to the educational process in the decades to follow. A time has come when, in the words of Henri Dieuzeide, 'instead of continuing to let the machine do only what the teacher cannot do, we should ask ourselves what it is the teacher should do that the machine cannot do.' All acceptable definitions of learning converge at a point that it refers to behaviour modification. As skinner puts it 'almost all our major problems involve human behaviour, and they connot be solved by biological technology alone. what is needed is technology of behaviour.'

Educational technology deserves to be understood in such a wider perspective. Gadgets by themselves would not go a long way, what matters really is how systematically they are yoked with the learning process. Systems approach seems to suggest the way educational technology could be put to effective operation.

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MANIFEST ANXIETY AND EDUCATIONAL PERFORMANCE

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Introduction :

A number of experimental studies have been conducted to establish some relationship between anxiety scores and the performance of the individuals (4, 7, 10, 12, 14, 18, 19, 22, 23, 24, 28, 29) and to test the drive properties of Taylor's Drive Theory of Manifest Anxiety (3, 20, 21, 25, 26, 27) but very few of them have shown that the Subjects belonging to the higher level of anxiety perform a task better than those who belong to the lower level of anxiety. On the other hand some studies have shown that the low anxious Subjects are superior to the high anxious Subjects on the simple and least complex tasks (2, 6, 8, 20, 29); while in certain other studies relating to the measures of General Anxiety and intellectual performances negative correlations have been found (5, 7, 10, 11, 22, 23, 24). Sarason (9), in one study has reported that anxiety was negatively related with several intellectual measures for both male and female Subjects.

The aim of the present study is to examine (i) whether there is any relationship between manifest anxiety scores and the educational performance scores and (ii) whether there is any difference between the educational performance scores of those male and female Subjects who belong to the equal levels of manifest anxiety, age group and the educational background.

Method :

(a) Subjects :- One hundred under-graduate students (50 male and 50 female) belonging to the age group of 18-20 years who offered only Hindi, Soci-

ology, Political Science and one General Coures subject as their optional subjects of study were selected from three post-graduate colleges of Ghaziabad (Meerut).

(b) **Tools** :- Sinha's W.A. Self-analysis Form (anxiety scale) which is highly reliable and valid measure of manifest anxiety (13, 15, 16, 17) was used to identify the levels of manifest anxiety and the marks-sheets issued by the University of Meerut were taken as the measure of the educational performance of the Subjects.

(c) **Procedure** :- The Subjects were administered Sinha's W. A. Self-analysis Form thirty days earlier to the commencement of the University examination of April, 1974 and according to the distribution of the anxiety scores they were divided into three groups—High Anxiety group (H.A.), Moderate Anxiety group (M.A.) and Low Anxiety group (L.A.). The upper 25% whose scores ranged from 39 to 44 formed H. A. group, the lower 25% whose scores ranged from 19 to 24 formed L.A. group and the rest whose scores ranged from 26 to 37 formed M.A. group.

After 30 days of the administration of the anxiety test the Subjects appeared in the University Examination. Thereafter, the University communicated the examination result by issuing the marks-sheets to the examinees and the concerned colleges. These examination-marks were taken as the educational performance scores of the Subjects.

Results :

Out of 100 Subjects, the original number of the sample, only 95 Subjects appeared in the examination and the rest 5 dropped out. The comparision of the performance scores of the three anxiety groups of the Subjects (H.A., M.A., L.A.) is being presented in Table No. 1. The group comparision with regards to the peformance scores of the male and those of the female Subjects have been shown in table No. 2 and 3 respectively. The comparision of the performance scores of male and female Subjects belonging to the equal levels of anxiety have been shown in table No. 4.

Table No. 1.

Group comparision with regards to the performance scores of the Male and Female Subjects combined.

Levels of anxiety	Mean performance scores	Standard Deviation	Number (*)	t	p
H. A.	85.92	19.90	26	2.10	.05
M. A.	76.60	20.30	47		
H. A.	85.92	19.90	26	5.50	.001
L. A.	64.08	19.20	22		
M. A.	76.60	20.30	47	13.91	.001
L. A.	64.08	19.20	22		

Table No. 2.

Group comparision with regards to the performance scores of Male Subjects.

Levels of anxiety	Mean performance scores	Standard Deviation	Number (*)	t	p
H. A.	87.45	19.20	11	2.22	.05
M. A.	70.59	21.90	22		
H. A.	87.45	19.20	11	2.08	.05
L. A.	60.15	20.50	13		
M. A.	70.59	21.90	22	1.43	N. S.
L. A.	60.15	20.50	13		

(*) The performance scores of 5 cases (4 male and 1 female) who dropped out have not been included in the results.

Table No. 3.

Group comparision with regards to the performance scores of Female Subjects

Levels of anxiety	Mean performance scores	Standard Deviation	Number (*)	t	p
H. A.	82.13	21.00	15	.07	N. S.
M. A.	81.72	18.30	25		
H. A.	82.13	21.00	15	1.71	.10
L. A.	69.77	15.50	09		
M. A.	81.72	18.30	25	3.00	.01
L. A.	69.77	15.50	09		

Table No. 4.

Group comparision with regards to the performance scores of those Male and Female Subjects who possess the equal level of anxiety.

Levels of anxiety		Mean performance scores	Standard Deviation	Number (*)	t	p
H. A.	Male	87.45	19.20	11	0.69	N. S
	Female	82.13	21.00	15		
M. A.	Male	70.59	21.90	15	2.06	.05
	Female	81.72	18.30	25		
L. A.	Male	60.15	20.51	13	1.32	N. S.
	Female	69.77	15.57	09		

(*) The performance scores of the 5 cases (4 male and 1 female) who dropped out have not been included in the results.

It is evident from table No. 1 that the Subjects belonging to the High Anxiety group (H. A.) secure more performance scores than those of M. A. group and L. A. group; and differences between the Mean performance scores of H.A. and M.A., H.A. and L.A. and M.A. and L.A. are statistically significant.

Table No. 2 (Male Subjects) shows that the performance scores of H. A. group are higher than those of M.A. and L.A. group; and the differences between the Mean performance scores of H.A. and M.A. and H. A. and L.A. are statistically significant. However, the performance scores of M.A. and L.A. group do not differ.

Table No. 3 (Female Subjects) reveals that the performance scores of H.A. group are higher than those of L.A. group and the performance scores of M.A. group are higher than those of L.A. group, and the differences between H.A. and L.A., and between M.A. and L.A. are statistically significant. However, the performance scores of M.A. and H.A. groups do not differ from each other.

Table No. 4 indicates that the performance scores of male and female Subjects do not differ at H.A. and L.A. levels. The difference is found at M A. level only.

Discussion & conclusion :

The present study is aimed to examine the drive properties of Taylor's Drive Theory of Manifest Anxiety (27) and according to which it was presumed that the high anxious Subjects would secure more performance scores than the low anxious Subjects; and that the performance scores of those male and female Subjects who belong to the equal levels of anxiety, age group and educational background would not differ.

With regards to the drive theory of manifest anxiety the results of table No. 1 are very clear and are evident to say that the Subjects who score high on the manifest anxiety scale also secure more marks on the educational performance. This, like the findings of Besch (1) Farber, (2) Sinha and Singh, (18) Spence and Farber, (19) Spence, Taylor and Rhoda (21), Taylor (25) and Taylor and Chapman, (28) makes us to believe that manifest anxiety possesses the drive properties. However, these findings are not consistent in the cases of male (table No. 2) and female Subjects (table No. 3). In the case of male Subjects there is no difference between the performance scores of M.A. and L.A. group, whereas H.A. group secures more performance scores than those of M.A. and L.A. group. Perhaps, this is because that the male Subjects are not drived by low level of anxiety for their better

educational performance or the low level of anxiety, as measured by Sinha's scale is the minimum normal level of anxiety which is always present in them and hence does not serve as the driving force. Thus, as per results, it appears that the moderate level of anxiety is the minimum essential level for the male Subjects from where they start for better performance and go up with the increase in anxiety. High level of anxiety is the best level for them to put them on the best performance.

On the other hand, the performance scores of female Subjects (table No.3) show a different Trend. Their M. A. group secures more performance scores than that of L.A. group whereas H.A. group does not differ from M.A. group. Perhaps, this is because that the low level of anxiety, as measured by Sinha's W. A. Self-analysis Form, is the minimum essential level of manifest anxiety to drive them for their better performance and thereby they go up in their performance with the increase in the level of their anxiety reaching the culmination of their performance at moderate level of anxiety. High level of manifest anxiety makes them either over-anxious or they fail to cope with that much level of anxiety. That is why, high level of anxiety has not served to drive them in further improvement of their performance. Thus, the mechanism of manifest anxiety as a driving force (27) works differently for male and female subjects.

So far the performance of those male and female Subjects who beleng to the equal levals of manifest anxiety is concerned our results (table no. 4) do not agree with that of Sarason (9). The performance scores of female Subjects are higher than those of the male Subjects at the moderate level of anxiety. Though they do not differ at H. A. and L. A. levels yet the superiority of the male Subjects at H. A. level and the superiority of female Subjects at M. A. and L. A. levels can be noted.

The entire discussion leads to conclude that manifest anxiety Possesses the drive properties (3, 20, 27) and the first presumption that the Subjects belonging to the higher leval of anxiety would secure more performance scores than those who belong to the lower level of anxiety is proved. Though, the mechanism of manifest anxiety works differently for male and female Subjects. This study fails to prove the second presumption that the performance of those male and female Subjects who belong to the equal levels of manifest anxiety, age and educational

back-ground would not differ, as the performance scores of male and female Subjects show a statistical significant difference. at M.A. level.

SUMMARY

One hundred under-graduate students of Meerut University were administered Sinha's W. A. Self-analysis Form to measure their levels of manifest anxiety. Their examination scores were taken as the scores of their educational performance. It was found that the Subjects belonging to the higher level of manifest anxiety secure more performance scores than those who belonged to the lower and moderate levels of anxiety. However, the mechanism of manifest anxiety works differently for male and female Subjects. The performance scores of those male and female Subjects whose anxiety level, age and educational background were similar differed at moderate level of manifest anxiety.

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3

TRACE AND TRACE FUNCTION

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Summary :

In this article the properties of trace of a linear transformation, and that of a matrix are proved, Also, contraction of tensors can be considered as the trace. The trace function has been defined over the vector space of matrices.

§1 : Fundamentals.

(1.1) Definition : A linear transformation on a vector Space V(F) to a vector Space W(F) is a function A whose domain is the whole of V and whose range is a subset of W, and which satisfies

$A (\alpha x + \beta y) = \alpha A (x) + \beta A (y)$,
for all $x, y \in V$ and all $\alpha, \beta \in F$. (F is a field)

(1.2) Definition : If A and B are linear transformations on $V (F) \rightarrow W (F)$ and if $\alpha \in F$; $x \in V$, the operations of $+$ and $\cdot$ on linear transformations are defined as $(A + B) (x) = A (x) + B (x)$
and $(\alpha \cdot A) (x) = \alpha \cdot A (x)$

(1.3) Theorem : The set of linear transformations on $V (F) \rightarrow W (F)$ is a vector space over F. (This vector space is denoted by L (V, W).).

(1.4) Definition : A linear transformation (or **operator**) on a vector space V (F) is a linear transformation on $V \rightarrow V$.

(1.5) Definition : An n-linear functional or **n-form** on V (F) is a function, ϕ, of n-vector variables, such that for all $x_1, x_2 \ldots x_n, y, z \in V$ and all α, β

$\in$ F, $\phi(x_1, x_2 \ldots x_n) \in$ F and

$$\phi(x_1, \ldots x_{i-1}, \alpha y + \beta Z, x_{i+1}, \ldots x_n)$$
$$= \alpha\phi(x_1, \ldots x_{i-1}, y, x_{i+1}, \ldots x_n) + \beta\phi(x_1, \ldots x_{i-1}, z, x_{i+1}, \ldots x_n)$$

for i = 1, 2, ... n.

(1.6) Definition : An n-form **alternates** w.r.t. its ith and jth arguments. if $\phi(x_1, \ldots x_{i-1}, x_i, x_{i+1}, \ldots x_{j-1}, x_{j-1}, x_{j+1}, \ldots x_n) = 0$ whenever x_i and x_j are equal. It is **alternating** if it alternates w.r.t. every pair of arguments.

(1.7) Definition : If ϕ and ψ are n-forms on V(F) and $\alpha \in$ F, then $\phi+\psi$ and $\alpha\cdot\phi$ are defined by the formulas $(\phi+\psi)(x_1, \ldots x_n) = \phi(x_1, \ldots x_n) + \psi(x_1, \ldots x_n)$ and $(\alpha\cdot\phi)(x_1, \ldots x_n) = \alpha\cdot\phi(x_1, \ldots x_n)$.

(1.8) Theorem : The set of all n-forms is a vector space w.r.t. + and · (as defined in (1.7)).

(1.9) Theorem : The set of all alternating n-forms is a subspace of a vector space of all n-forms.

(1.10) Theorem : The space of alternating n-forms is one-dimensional.

(1.11) Definition : If $\{x_1, \ldots x_M\}$ (i.e. $x]_1^M$) and $(y_1, \ldots y_N)$ (i.e. $y]_1^N$) be the bases for finite dimensional vector spaces V and W respectively over the same field and if A is a linear transformation (L. T.) on V $\rightarrow$ W then the matrix [A] or $[A : x], y]] = [\alpha^j_i]$ where α^j_i is the jth co-ordinate of Ax_i relative to the basis y], is called the **matrix of the L.T.A** (or matrix associated with the L.T.A.).

(1.12) Theorem : If $[\alpha^j_i]$ and $[\beta^j_i]$ are the matrices associated with L.T.A and B (both on V$\rightarrow$W) and if $[\gamma^j_i]$ and $[\delta^j_i]$ are the matrices associated with A+B and $\xi\cdot$A (where $\xi \in$ F) respectively, then $\gamma^j_i = \alpha^j_i + \beta^j_i$ and $\delta^j_i = \xi\alpha^j_i$

(1.13) Definition : If $[\alpha]$ and $[\beta]$ are N$\times$M matrices then the **addition** of two matrices $[\alpha]$ and $[\beta]$ (i.e. $[\alpha] + [\beta]$) is the matrix $[\gamma]$ where

$$\gamma^j_i = \alpha^j_i + \beta^j_i,$$

(1.14) Definition : If $[\alpha]$ is an N $\times$ M matrix and if $\xi \in$ F then the **scalar multiplication** of a matrix $[\alpha]$ by ξ (i.e. $\xi[\alpha]$) is the matrix $[\delta]$ where $\delta^j_i = \xi\cdot\alpha^j_i$.

(1.15) Definition : If U and V are vector spaces (over the same field), their **direct sum** is the vector space W (denoted by U (+) V) whose elements

are all the ordered pairs $<x, y>$ with $x \in U$ and $y \in V$, with the linear operations defined by $\alpha_1 <x_1, y_1> + \alpha_2 <x_2, y_2> = <\alpha_1 x_1 + \alpha_2 x_2, \alpha_1 y_1 + \alpha_2 y_2>$.

(1.16) Definition : The **tensor product** U (×) V of two finite dimensional vector spaces U and V (over the same field) is the dual of the vector space of all bilinear forms on U (+) V. For each pair of vectors x and y ($x \in U$, $y \in V$), the tensor product $z = x$ (×) y of x and y is the element of U (×) V defined by z (w) = w (x, y) for every bilinear form w.

(1.17) Definition : Let R^r_s be the tensor of contravariant rank r and covariant rank s. R^{r-1}_{s-1} is the first contraction of R^r_s. If r = s then R^r_s can be reduced to a tensor of rank zero (or an invariant). The contraction, in this case, is said to be complete. The contraction is the linear mapping (or function) on the tensor space R_1^1 to invariant space R_0^0.

This mapping (or **Contraction**) is defined by the following rule

$\Sigma\, x_i \times y_i^* \times z_j \rightarrow \Sigma\, y_i^*\ (x_i)\ z_j$ where $x_i \in R$, $y_i^* \in R^*$ and $z_j \in R$ (×) R^*.

§2. Trace of the linear transformation.

Let A be a L.T. on an N-dimensional space V (F). Let ϕ be any alternating N-form on V(F).

Let $\psi\ (x_1, x_2, \ldots x_N) = \sum_{i=1}^{N} \phi\ (x_1, \ldots x_{i-1}, Ax_i, x_{i+1}, \ldots x_N)$.

Then it can be shown that

(2.1) ψ is an alternating N-form on V (F)

(2.2) $\psi = \alpha \cdot \phi$ where $\alpha \in F$ (By **(1.10)**)

(2.3) α in (2.2) does not depend on the choice of the form ϕ.

(2.4) Definition : This α is called the **trace** of the linear transformation A.

(2.5) Notation : Trace of the L.T.A is denoted by Tr A.

§3. Properties of Tr A.

§(3.1) If $[x]_1^N$ is a basis for V (F) and if the matrix of the transformation A w.r.t. t l is basis is

$[A; x], x]] = [\alpha_i^j]$ then Tr $A = \sum_{i=1}^{N} \alpha_i^i$

Proof: $[A; x], x]] = [\alpha_j^i] = \begin{bmatrix} \alpha_1^1 & \alpha_2^1 & \dots & \alpha_N^1 \\ \alpha_1^2 & \alpha_2^2 & \dots & \alpha_N^2 \\ \hline \alpha_1^N & \alpha_2^N & \dots & \alpha_N^N \end{bmatrix}$

(3.11) $\therefore A x_i = \sum_{j=1}^{N} \alpha_i^j x_j$ **(by 1.11)**

Now, by definition of the Tr A and (3.11),

$$\text{Tr } A \cdot \varphi(x_1, \dots x_N) = \sum_{i=1}^{N} \varphi\left(x_1, \dots x_{i-1}, \sum_{j=1}^{N} \alpha_i^j x_j, x_{i+1}, \dots x_N\right)$$

$$= \sum_{i=1}^{N} \left[\sum_{j=1}^{N} \alpha_i^j \varphi(x_1, \dots x_{i-1}, x_j, x_{i+1}, \dots x_N)\right] \quad \text{(by 1.5)}$$

$$= \sum_{i=1}^{N} \alpha_i^i \phi(x_1, \dots x_N) \quad \text{(by 1.6)}$$

$$= \left(\sum_{i=1}^{N} \alpha_i^i\right) \cdot \varphi(x_1, \dots x_N)$$

(3.12) $\therefore \text{Tr } A = \sum_{i=1}^{N} \alpha_i^i$

§(3.2) For $A_1, A_2 \in L(V, V)$,

$\text{Tr}(A_1 + A_2) = \text{Tr } A_1 + \text{Tr } A_2$.

Proof: Let $[A_1; x], x]] = [\alpha_i^j]$

and $[A_2; x], x]] = [\beta_i^j]$

(3.21) $\therefore \text{Tr } A_1 = \sum_{i=1}^{N} \alpha_i^i$ (by 3.12)

(3.22) and $\text{Tr } A_2 = \sum_{i=1}^{N} \beta_i^i$

Also, by (1.12),

$[A_1 + A_2; x], x]] = [\alpha_i^j + \beta_i^j]$

$\therefore \text{Tr}(A_1 + A_2) = \sum(\alpha_i^i + \beta_i^i)$

$= \sum \alpha_i^i + \sum \beta_i^i$

$= \text{Tr } A_1 + \text{Tr } A_2$ (by 3.21 & 3.22)

(3.23) $\therefore$ Tr ($A_1 + A_2$) = Tr A_1 + Tr A_2

§ **(3.3)** If $A \in L(V, V)$, $\mathfrak{s} \in F$ then

Tr ($\mathfrak{s}A$) = $\mathfrak{s}$ Tr A

Proof : Let $[A, x], x] = [\alpha^i{}_i]$

(3.31) $\therefore$ Tr $A = \sum_{i=1}^{N} \alpha^i{}_i$ (by 3.12)

Also, $[\mathfrak{s}A, x], x]] = [\mathfrak{s}\alpha^i{}_i] = \mathfrak{s}[\alpha^i{}_i]$ (by 1.12)

$$\therefore \text{ Tr } (\mathfrak{s} A) = \sum_{i=1}^{N} \mathfrak{s}\, \alpha^i{}_i$$

$$= \mathfrak{s} \sum_{i=1}^{N} \alpha^i{}_i$$

$$= \mathfrak{s} \text{ Tr } A \qquad \text{(by 3.31)}$$

(3.32) $\therefore$ Tr ($\mathfrak{s}$ A) = $\mathfrak{s}$ Tr A

§ **(3.4)** For $A_1, A_2 \in L(V, V)$, Tr $(A_1 \cdot A_2)$ = Tr $(A_2 \cdot A_1)$

Proof : Let $[A_1, x], x]] = [\alpha^i{}_i]$ and

$[A_2, x], x]] = [\beta^i{}_i]$.

Also, $[A_1; x], x]]\ [A_2; x], x]] = [A_1 \cdot A_2; x], x]]$ (by Ref (7.1))

(3.41) $\therefore$ Tr ($A_1 \cdot A_2$) $= \sum_i \alpha^i{}_i \sum_k \beta^k{}_k$

$$= \sum_i \sum_k \alpha^i{}_i\, \beta^k{}_k$$

Similarly,

(3.42) Tr $(A_2 \cdot A_1) = \sum_i \beta^i{}_i \sum_k \alpha^k{}_k = \sum_k \beta^k{}_k \sum_i \alpha^i{}_i$ ($\because$ i & k are dummy)

$$= \sum_i \sum_k \alpha^i{}_i\, \beta^k{}_k$$

Hence,

(3.43) Tr $(A_1 \cdot A_2)$ = Tr $(A_2 \cdot A_1)$.

§ **(3.5)** Tr : $L(V, V) \to F$ is a L.T.

Proof : Let $A_1, A_2 \in L(V, V)$ and $\alpha, \beta \in F$

$\therefore$ Tr $(\alpha A_1 + \beta A_2)$

$= \text{Tr}(\alpha A_1) + \text{Tr}(\beta A_2)$ (by 3.23)

$= \alpha \text{Tr}(A_1) + \beta \text{Tr}(A_2)$ (by 3.32)

$\in F$.

$\therefore$ For $A \in L(V, V)$; Tr A is a linear functional $L(V, V) \to F$.

§ (3.6) If $\lambda_1, \lambda_2 \ldots \lambda_N$ be the *eigen-values of A; then

Tr $A = \lambda_1 + \lambda_2 + \cdots + \lambda_N$.

(* Ref (7.1))

Proof : Let $Ax_i = \lambda_i x_i$ for i=1,2,...N.

Then, $[A; x], x]] = \text{diag}(\lambda_1 \cdots \lambda_N)$

where diag $(\lambda_1, \cdots \lambda_N)$ is the matrix having all the elements except the diagonal elements are zero; and the diagonal elements are $\lambda_1, \lambda_2, \cdots \lambda_N$

Hence by definition,

(3.61) Tr $A = \lambda_1 + \lambda_2 + \cdots + \lambda_N$.

§ (3.7) If $\theta \in L(V, V)$ then Tr $(\theta) = 0$; where θ is the zero operator.

Proof : $[\theta, x], x]] = [0]$

(3.71) Hence, Tr $(\theta) = 0$.

§ (3.8) If $I_v \in L(V, V)$ be the identity operator then Tr $(I_v) = N$ (= dim V)

Proof : $[I_v, x], x]] = I$, the $N \times N$ identity matrix where N = dim V.

(3.81) $\therefore$ Tr $(I_v) = 1+1+\ldots+1 = N$ (= dim V)

§ (3.9) If $\tilde{A}$ is the dual transformation of $A \in L(V, V)$ then Tr $\tilde{A}$ = Tr A.

Proof: $\left[\tilde{A}; \tilde{x}], \tilde{x}] \right] = [A; x], x]]^T$ (Ref. (7.1))

$\therefore$ Tr $^s A$ = Tr A ($\because$ Diagonal elements are the same in both of these matrices).

§ 4. Trace of matrix :

(4.1) Definition : If $[\alpha] = [\alpha^i_i]$ be the square matrix, then trace of a matrix $[\alpha]$ is defined as Tr $(\alpha] = \sum_{i=1}^{N} a^i_i$, where N is the order of the matrix $[a]$.

$(a^i_i \in F)$

Let the set of $N \times N$ matrices be denoted by F_N. It can be shown rhat F_N forms a vector space with the matrix operations + and · (1.13 & 1.14) over a field F.

The following results are obvious or can be derived easily.

(4.2) $A, B \in F_N$, $Tr\ (A + B) = Tr\ A + Tr\ B$.

(4.3) $A \in F_N$, $\varrho \in F$, $Tr\ (\varrho A) = \varrho\ Tr\ A$

(4.4) $A, B \in F_N$. $Tr\ (A \cdot B) = Tr\ (B.A)$

(4.5) $Tr : F_N \rightarrow F$ is a L.T.

(4.6) $Tr\ [\theta] = 0$, θ is the zero $N \times N$ matrix.

(4.7) $Tr\ [I] = N$, I is the identily $N \times N$ matrix.

(4.8) $Tr\ [A]^T = Tr\ [A]$ where $[A]^T$ is the transpose of [A] and $A \in F_N$.

(4.9) If A is skew-symmetric matrix $\in F_N$. then Tr [A] = 0.

(4.10) $Tr\ [\frac{1}{2}(A + A^T)] = Tr\ A$; $A \in F_N$. (by 4.8 & 4.9)

(4.11) $Tr\ [A\ A^T] > 0$ if $A \neq 0$, $A \in F_N$ is an orthogonal matrix,

(4.12) If $A \in F_N$ is invertible then $Tr\ (A\ C\ A^{-1}) = Tr\ C$.

[**Proof** : $Tr\ (A\ C\ A^{-1})$

$= Tr\ [(AC)\ A^{-1}]$

$= Tr\ [A^{-1}\ (AC)]$

$= Tr\ [A^{-1}\ A\ C]$

$= Tr\ [I\ C]$

$= Tr\ C$]

(4.13) If $T_rA = 0$ and if the characteristic (Ref (7.3)) of F is zero, for $A \in F_N$ then there exists $C \in F_N$ such that CAC^{-1} has only zeros on its main diagonal and there exist B, $C \in F_N$, such that $A = BC - CB$.

§ 5. Trace Function :

Let f be a function defined on F_N having its values in F such that

(i) $f\ (A + B) = f\ (A) + f\ (B)$

(ii) $f\ (\lambda A) = \lambda\ f\ (A)$

(iii) $f\ (A\ B) = f\ (B\ A)$

for all A, B $\in F_N$ and all $\lambda \in F$. Then it can be shown that there exists an element $\alpha_0 \in F$ such that $f(A) = \alpha_0 T_r A$ for every $A \in F_N$.

[**Hint :** $T_r A$ obeys the conditions of f. $f \in F$; $T_r A \in F$. F is one dimensional $\therefore$ if $A \neq o$, $f = \alpha_0$. $T_r A$ is unique representation.]

Now if the characeristic of F_N is O and if A = I and f (I) = N; then it can be proved that $f(A) = T_r A$ for all $A \in F_N$.

This function f Is called the **trace function.**

§ 6. Trace by contraction of Tensors :

The space L (R, R) of linear transformations in R can be regarded as the tensor space R_1^1 Now if we take the notion of contraction of tensors, then R_1^1 becomes an invariant (ie scalar) after contraction. Also trace is a scalar $\in$ F.

This scalar can be taken as the invariant obtained after contraction.

Hence notion of contraction can be treated as the trace of a transformation (or a matrix).

Using the direct sums and tensor products it can be shown that

(6.1) $T_r (A + B) = T_r A + T_r B.$

(6.2) $T_r (A + B) = (T_r A) (T_r B).$

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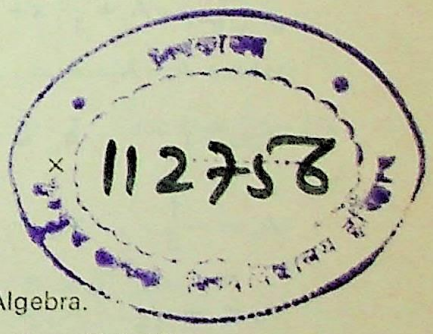

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THE APPLICATION OF THE THEOREM OF VON STAUDT

by

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Introduction :

The theorem of Von Staudt is the relation between Bernoulli's numbers and primes. AB'S number are also defined as the Coefficient of x in the expansion.

$$\frac{2x}{e^x - e^{-x}} = A_0 + \frac{A_1}{1!}x + \frac{A_2}{2!}x^2 + \frac{A_3}{3!}x^3 + \ldots\ldots\ldots$$

where $A_1 = A_3 = A_5 = \ldots\ldots\ldots = 0$

$A_0 = 1$, $A_{10} = -\frac{2555}{33}$

$A_2 = -\frac{1}{3}$, $A_{12} = \frac{1414477}{1365}$

$A_4 = +\frac{7}{15}$, $A_{14} = -\frac{57337}{3}$

$A_6 = -\frac{31}{21}$, $A_{16} = \frac{118518239}{255}$

$A_8 = \frac{127}{15}$, ...

The importance of numbers Comes primarily from their Occurrence in the Sum-formula $\sum r^k$, where r=1, 3, 5, ..., p.

(1) In fact, $1^k + 3^k + \ldots\ldots + p^k = \frac{1}{2}\sum_{r=0}^{k} \frac{1}{K+1-r} {}^kC_r (2p)^{k+1-r} A_r$

for $K \geqslant 1$. For the left-hand side is the Coefficient of x^{k+1} is

$$2x\ (e^x+e^{2x}+\ldots\ldots+e^{px}) = 2x\ e^x\ (1+e^{2x}+e^{4x}+\ldots\ldots+e^{(p-1)x})$$

$$= 2xe^x \frac{(1-e^{2xp})}{1-e^{2x}}$$

$$= \frac{2x}{e^x-e^{-x}}\ (e^{2xp}-1)$$

$$= \left\{Ao+\frac{A_1x}{1!}+\frac{A_2x^2}{2!}+\ldots\ldots+\frac{A_kx^k}{K!}+\ldots\ldots\right\}X$$

$$\left\{2px+\frac{2^2p^2x^2}{2!}+\ldots\ldots+\frac{2^kp^kx^k}{K!}+\ldots\ldots\right\}$$

$$\frac{2}{K!}\ (1^k+3^k+\ldots\ldots+p^k) = \left\{\frac{2^{k+1}p^{k+1}}{(K+1)!}A_o+\frac{2^kp^k}{K!}\frac{A_1}{1!}+\frac{2^{k-1}p^{k-1}}{(K-1)!}\frac{A_2}{2!}+\ldots\ldots\right.$$

$$\left.+\frac{2P}{1!}\frac{A_k}{K!}\right\}$$

Hence $2\ (1^k+3^k+\ldots\ldots+p^k) = \sum_{r=0}^{K} \frac{1}{K+1-r}\ {}^kC_r\ 2^{k+1-r}p^{k+1-r}A_r$

AB'S Theorem :

It $K \geqslant 2$, then

$A_k + \sum_{2p-2/K} \frac{e_k\ (2p-1)}{2p-1} = i$, where i is an integer.

The Summation being entended over the primes 2p--1 Such that 2p—2/K where

(2) K=2, 4, 6,.....

Note (i) AB'S number A_r is the Coefficient of n in $S_r = \sum (2n-1)^r$

(ii) We define, $e_k\ (2p-1) = 1$, if 2p—2/K.

$= 0$, if 2p—2χK.

Since 2p—1 is a prime number for certain values of p.

Hence $A_k + \sum \frac{e_k\ (2p-1)}{2p-1} = i$

i is an integer and 2p — 1 now runs through all primes. In particular, AB'S numbers shows that there is no squared factor in the denominator of any AB'S numbers.

Proof of AB'S theorem :

The proof of the theorem depends upon the following lemma :

Lemma :

$1^k+3^k+\ldots\ldots+(2p-1)^k \equiv -e_k \ (p) \pmod p$

Since P is prime,

If $2p-2/K$. then $1^k \equiv 1 \pmod p$

$$3^k \equiv 3^{(2p-2)k'} = \left(\begin{matrix} 2k' \\ 3 \end{matrix}\right)^{p-1} \equiv 1 \pmod p$$

$$5^k \equiv 1 \pmod p$$

...

$$(p-2)^k \equiv 1 \pmod p$$

$$p^k \equiv 0 \pmod p$$

...

$$(2p-1)^k \equiv 1 \pmod p$$

Hence $1^k+3^k+5^k+\ldots\ldots+p^k+\ldots\ldots+(2p-)^k \equiv p-1 \equiv -1 \equiv -e_k(p) \pmod p$

If $2p-2 \times k$ and g is a primitive root of p, then $g^k \not\equiv 1 \pmod p$

The set g, 3 g, ..., (p—2)g, pg, ... (2p—1) g are equivalent (mod p), and therefore

$$(1g)^k+(3g)^k+\ldots\ldots+\{(p-2)g\}^k+(pg)^k+\ldots\ldots+\{(2p-1)g\}^k$$
$$\equiv 1^k+3^k+\ldots.+(p-2)^k+p^k+\ldots.(0+2p-1)^k$$

Hence $(g^k-1)\ (1^k+3^k+\ldots\ldots+p^k+\ldots\ldots+(2p-1)^k) \equiv 0 \pmod p$

$1^k+3^k+\ldots\ldots+(2p-1)^k \equiv 0 \equiv -e_k \ (p) \pmod p$

Hence $1^k+3^k+\ldots\ldots+(2p-1)^k \equiv -e_k \ (p)$ in any case

We now prove the main theorem by induction.

Lek K=2, $A_2+\frac{1}{2}=-\frac{1}{2}+\frac{1}{2}=0$ (Integer)

Now assuming that it is true for any number λ of the sequence (2) less than K, and deducing that it is true for K. In what follows K and λ belong to (2). r runs from 2 to K, $A_0=1$, $A_3=A_5=\ldots\ldots=0$.

We have already verified the theorem when K=2 and we may suppose K>2. It follows from (1) and lemma that ϖ is any prime

$$2\, e_k\, \varpi + \sum_{r=0}^{K} \frac{1}{k+1-r}\binom{K}{r} 2^{k+1-r}\, \varpi^{k+1-r}\, A_r \equiv 0 \pmod \varpi$$

Hence $2\, e_k\, \varpi + \sum_{r=0}^{K-2} \frac{1}{k+1-r}\binom{K}{r} 2^{k+1-r}\, \varpi^{k+1-r}\, A_r$

$$+ \frac{1}{2}\binom{K}{K-1}\binom{k}{k-1} 2^2\, \varpi^2\, A_{k-1} + \binom{K}{K}\binom{k}{k} 2\, \varpi\, A_k \equiv 0 \pmod 1$$

Since $A_{k-1} = 0$

Therefore, $A_k + \frac{e_k\,(\varpi)}{\varpi} + \sum_{r=o}^{k-2} \frac{1}{k+1-r}\binom{K}{r} 2^{k-r}\, \varpi^{k-1-r}\, (\varpi\, Ar) \equiv 0 \pmod 1$

We consider whether the denominator of $U_{k,r} = \frac{1}{k+1-r}\binom{K}{r} 2^{k-r}\, \varpi^{k-1-r}\, (\varpi Ar)$ can be divisible by ϖ

If r is an ℓ, then, by inductive hypo thesis, the denominator of A_r has no squared factor and $(\varpi\, A_r)$ is not divisible by ϖ

The factor $\binom{K}{r}\ 2^{k-r}$ is integral, Hence the denominator of $U_{k,r}$ is divisible by ϖ only if that of $\frac{w^{k-1-r}}{k+1-r} = \frac{w^{s-1}}{s+1}$ is divisible by ϖ

In this case $s+1 \geqslant w^s$

But $s = k-r \geqslant 2$ and therefore

$$s+1 < 2^s \leqslant \varpi^s$$

a contradiction. It follows that the denominator of u_k,r is not divisib le by ϖ.

Hence $A_k + \frac{e_k\,(\varpi)}{\varpi} = \frac{c_k}{d_k}$

wher $\varpi \times d_k$, and $\frac{e_k\,(2p-1)}{2p-1}$ $(2p-1 \neq \varpi)$ is obviously of the same form.

It follows that

(3) $A_k + \sum \frac{e_k\,(2p-1)}{2p-1} = \frac{C_k}{D_k}$

where D_k is not divisible by ϖ. Since ϖ is an arbitrary, prime. D_k must be 1. Hence the right-hand side of (3) is an integer, and this proves the theorem.

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5

HIGHER EDUCATION-A CHAOTIC SECTOR OF ECONOMY

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There is general agreement on the fact that there is something wrong somewhere with our system and set up of higher education because we are faced with certain problems which coexist, although any one of them seems to be opposed, to any other. For example, we observe that :

(i) There is a high rate of unemployment among persons who have received higher education

(ii) There is a shortage of right type of trained personnel for available jobs and

(iii) There is scarcity of funds for higher education.

In fact, if any one of the above problems exists singly the other one or two logically should not exist. (i) If so many persons have no jobs, why should we have shortage of the right type of persons ? (ii) If there is scarcity of funds, why should we have so many persons receiving education and remaining unemployed ? and so on.

These problems have their obvious manifestations such as :

(i) unrest and indiscipline among students in college and university campuses (ii) agitations by teachers for increase in emoluments and delay in their payments (iii) absence of healthy relations between the main organs of an institution, viz, the management, the teachers and tne students (iv) ever-increasing load of finanancial liabilities of institutions of higher education (v) deterioration in the

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quality of education and (vi) a high rate of "Education Wastage" due to drop-outs and "Stagnation" due to failures in examinations every year.

An attempt is made is this peper to understand such an undesirable situation and suggest a remedy.

II Let us first examine the set up of an institution of higher education.

(i) Education happens to be a subject neither fully under the State Govenment nor the Central Government; it is in the concurrent list.

(ii) The Central and State Government do give some grants to the institutions of higher education, but the policy of grant-in-aid is ex-gratia and is thus decided arbitrarily and varies from state to state and from time to time.

(iii) None of the Govarnments either plans for higher education or undertakes responsibility for its finances and for fulfilling the region-wise needs of personnel.

(iv) There is practically no control by any agency over the increase in the enrolment and the expenditure in educational institutions in the area of higher education. Though the state government grants affiliation to colleges it is only a matter of formality as it is granted on recommendation of the university concerned. The university is not obliged to accept any financial responsibility for the decisions it takes. It considers itoelf free to take decisions on the specious plea of university autonomy.

(v) The university being an autonomous institution has the power and authority to increase the financial burden of affiliated colleges by framing and amending rules and regulation without any corresponding obligation to share the consequential increase in expenditure. This adds to the chaos which already exists.

(vi) The institutions of higher education (Colleges or Universities) are found to exist in a state of perpetual financial difficulty which is chronic in nature and which creates an unhealthy atmosphere and tension within the institutions. This brings about further deterioration in the quality of education.

III An examination of the availabiity of funds both in quantum and relative share for the sector of higher education will reveal an intersting picture of the goverment's share and trend in successive Five Year Plans.

Table I

Allocation of funds for education in Five year Plans

	Education sector percentage of total outlay	Higher Education as percentage of total outlay.
First Plan	7.6	0.68
Second Plan	5.8	0.98
Third Plan	7.7	1.00
Fourth Plan	5.6	1.33
Fifth Plan	4.6	0.92

The table brings out the fact that the share of higher education is very low, near about 1%, and is more or less stationary. This is because the expenditure on primary and secondary education which are the primary responsibility of the government make heavy demands on funds and would not enable the government to allocate a larger share for higher education (despite their best intetntions). The priority being what it is the situation is not going to change materially in future.

Another important feature in the outlays which calls for attention is that the percentage of outlay for all education is steadily falling while that for the sub-sector of higher education is rising from plan to plan even if only slightly.

In absolute terms Government expenditure on education has risen, from about Rs. 57 crores (or less than half a percent of national income) in 1947 to about Rs. 1350 crores (or about 3 percent of national Income) in 1974. This implies growth of about 10 percent per annum, which is about twice the rate of the growth of our national income.

IV As regards enrolment at the various levels of education, it is found that the higher the level of education, tha higher is the rate of increase in enrolment. These rates are approximately 9% at primary level, 11% at secondary level, 13% at collegiate or undergraduate level and about 18% at university or postgraduate level. This is a perverse trend very much in the opposite direction to what was intended. This fact is also brought out by the expected and actual enrolment figures at different levels for the year 1971.

Total II

Expected and Acutal Enrolment at different levels of education : by 1971.

Enrolment	Target (in millions)	Actuals (in millions)
Primary level	69.75	59.37
Middle school level	19.00	13.44
Secondary level	9.00	7.28
Higher level	1.60	2.50

The rate of increase in enrolment at different levels and the figures given in the above table regarding actuals indicate that the growth in education after independence has indeed been lopsided. Since the funds required at any level of education is generally proportional to the enrolment of students, higher education has been appropriating more fuuds than what has been planned.

Primary level education has been considered to be the basic requirement for social, political and economic development of the nation and accordingly the goal of universal, free and compulsory primary education has been accepted by the nation and a consitutional directive has been laid down also for the same purpose. The nation's inability to achieve the target in the field of primary education is thus a major and serious failing. On the other hand over shooting the targets of enrolment in higher education, besides appropriating more funds, which is perhaps at the cost of primary education, has created a host of other problems like unemployment of degree holders frustration and unrest among those who have received this education.

This state of affairs urgently calls for reconsideration and a policy of allocating funds for higher education in total quantity and the mode of its optimum utilisation.

The foregoing discussion leads us to examine in some detail the cost of higher edacation and find out how total expenditure on higher education is financed, that is, shared by different agencies such as the government, the community and students.

The total cost of education may be divided into two parts :

(i) The cost of creating a seat. which we may call ' Capital Cost" and (ii) the cost of operation of the seat created, which may be called "Current Cost". The

share of Government and other agencies two types of cost at different levels of education is given below :

Tabel III

Share of different agencies in expenditure on higher education.

	Capital Cost		Current Cost	
	Govt share	Community share	Govt share	Students, share
(i) Primary level	50%	50%	100%	—
(ii) Secondary level	—	100%	100%	—
(iii) undergraduate level	—	100%	33%	50% *
(iv) Postgraduate level (university departments and technical education)	100%	—	90%	10%

* Estimates of percentage share of expenditure by various agencies as worked out from records of colleges affiliated to S. G. university for the year 1973. These shares will of course vary from university to university, from college to college, and from faculty to faculty.

(Note : Percentage of Current Cost given in third and fourth level are approximate).

If we examine the above table giving the shares of different aegncies of Capital and Current Cost of Education at different levels, it will be clear that there does not seem to be any principle or definite policy in the manner in which government bears the cost. Let us have a close look at the government share at different levels.

(i) Primary education which is the prime responsibility of the government and hence 50% share towards capital cost and 100% share towards current cost borne by the government are fully justified. It would be more proper if the remaining 50% of the capital cost which the community has to shoulder at present also is borne by the government in the backward areas.

(ii) Secondary education has been accepted as the government's full responsibility in some states. But as the figures will show the government pays nothing towards capital cost, while it subsidises to an extent of 100% towards current cost, It woulld be fully justified if the students from upper class families are made to bear their current cost fully or at least partially. Other ways and means can conveniently be suggested to lighten the Government's burden of the total current cost of secondary level education. This, however, does not happen to be the purpose of this paper.

(iii) As regards undergraduate or college level education, the relative share of government will reveal its utter indifference for this level, as it pays nothing towards capital cost and hardly bears a maximum of 33% of the current cost, by way of grants. The fees charged to the students (as recommeded by the Government) hardly meets 50% of the current cost. Neither the government nor the students shoulder any responsibility for the remaining 17% of the current cost. The uncovered gap is partly responsible for all the problems mentioned earlier.

(iv) Coming to the fourth level, the capital cost being a very heavy load is rightly borne by government to the extent of 100%, but the fact that the government subsidises current cost at this level to a large extent, that is as much as 90% is difficult to justify. This seems to be a luxury which a poor and developing country like ours can hardly afford.

VI Suggestion for the revision of the pattern of allocation of government funds towards capital and current cost :

Let us consider the cost of higher education only. As regards the existing pattern of financing the capital cost, 100% community share at third level and 100% government share at fourth level-does need some reconsideration; however, this pattern does not seem to pose such an acute problem at present.

The source of most of the evils is the mode and pattern of government subsidsing the current cost of education at the third and fourth levels. For the current cost at third level education, the students meet with approximately 50% share; the government meets a maximum of 33% share and neither the students nor the government shoulder any responsibility for the remaining 17% Since

the students have to pay only one half of the current cost, the number joining the third level education is fast increasing which eventually results in an increase in the total current cost. Obviously the amount of subsidy by the government goes on increasing from year to year with such a high rate and the unfilled gap of 17% also goes on widening with the same speed. The existing pattern of financing current cost at the third level is thus one of the trouble spots.

The pattern of financing the current cost at the fourth level is till worse since the students have to pay only 10% of the current cost, there is bound to be a mad rush of students for fourth level education. This level of education has the highest rate of increase in enrolment, as is metioned in an earlier paragraph. Obviously the amount of subsidy by the government (to the extent of 90%) has been fast increasing and will continue to increase year by year with an accelerating high rate. It will not be possible for the nation in the very near future to meet with such a wasteful demand on funds. This is another more serious trouble spot and poses grave problems for higher education.

It is with this view in mind that the government policy of subsidising current cost for higher education requires immediate and serious attention for revision of the policy of subsidising the current cost both at the third and fourth levels of education.

One of the possibe ways of getting out of this vicious circle in higher education is that instead of financing or subsidising institutions directly the government should provide indirect assistance by subsidising in some form the fees of students who may be asked to bear the full current cost of their higher education at both the levels. The students wanting to take higher education may be divided into three to four categories according to the income of their parents :

(i) The students coming from the highest income group should be asked to bay the full current cost without any aid from the government.

(ii) Those from other groups may be given interest-free loan to an extent to enable them pay the full cost. The loan may be recovered in easy instalments spread over a long span of time (say 1o to 15 years) after they complete their studies and get employment. The recovery of the loan from such students may be treated as a civil tax liability.

(iii) From among the recipients of the loan students from the lower income groups or socially and economically backward classes, the conditions of repayment of loans may be suitably waived and the most deserving students may even be fully exempted from repayment.

VII Justification of the suggested revised pattern :

(i) one of the two benefits–social and private–which accrue from higher education, the private individual benefit is much higher than the social benefit and hence there is every justification in making the aspirant for higher education pay the full current cost, especially when he pays the entire cost of everythidg be needs in his daily life. (ii) In general, the higher the education a person receives the higher is his income. At any rate we may say that there is a positive correlation between educational level and income level. This is more true in cases of persons who receive postgraduate technical education (such as Engineering or Medical). In such cases, the private individual benefit of the fourth level education is much more than the social benefit. For those engineers and doctors who emmigrate to other countries after training in the home country, the social benefit of the cost is at zero and the prlvate individual benefit is at the maximum. Therefore, there is absolutely no justification in subsidising the fourth level education to an extent of 90%. And in view of the above. such a student receiving fourth level education must be made to pay the full current cost of his education. The highest rate of rise (18%) in number of students at the fourth level is partly due to the fact that they get almost free education at that level. (iii) The financial burden of higher education will thus rightly be transferred from the general tax payer to the first beneficiary who derives all the advantages of higher education. (iv) Studies on the socio–economic status of the college students suggest that higher education is largely restricted to a relatively well–to-do sections of Indian society and indicate that highly subsidised college and university education benefits the elite much more than it does the masses. (v) This reform will not deprive any one of the opportunity of receiving higher education as no needy person will be denied loan facilities by government.

VIII Benefits of the suggested revised pattern :

(i) Since higher education will thus cost the individual in monetary terms, the indiscriminate and mad rush for higher education will be checked and

only those who are serious and earnest about their goals will go in for it. This will automatically reduce the unrest and indiscipine in the campuses.

(ii) This will also result in the solution of the problem of educated unemployment as the beneficiary will have to give due thought as to whether he should go in for higher education even by increasing his financial liabiltiy. Besides, he will have to be more discriminating in selection of the appropriate course of study depending on his ability. aptitude and anticipated scope for employment after the trainig.

(iii) As only the serious minded students will join the institutions of higher education in the appropriate faculty the enormous "stagnation and wastage" as they exist today due to failures and dropouts will be considerbly reduced.

(iv) Since a smaller number of students will go in for higher education the capital cost of education will also be proportionately reduced. This possible saving can be used for improving the existing library and laboratory facilities.

(v) Since the student is made to pay the full current cost of higher education the government will not have to incur any recurrent expenditure on higher education (except for the first 4 to 6 years in the beginning, which amount may be borrowed from the public by raising loans or otherwise) and therefore, can easily direct the same funds to useful research activitites relevant to the needs of the country.

(vi) As regards college level education, abouti 85% of the colleges in the country are in the private sector. The 17% recurring deficit on an average in the current cost of such institutions will automatically disappear. This will create healthy relations between the students, the teachers and the managements. The funds which the private managements can raise from the voluntary sources can be better utilized for improving existing facilities in colleges.

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6

WORK EXPERIENCE IN OUR SCHOOLS.

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One of the most important recommendations of the Education Commission (1964–66) is the introduction of work–experience as an integral part of all education. The working Group on Vocationalisation of Education and work Experience set up by the Planning Commission recommended in 1968 that Work–Experience in Schools should include the following ;

1. The practice of clean and healthy living ;
2. The learning of elementary skills needed in everyday life by the use of simple tools leading to productive work ; and,
3. Participation in socially useful activities in the schools and in the community.

Mr. V. Lakshmi Narayanan has emphasised to keep the following few points in mind while thinking about work-experience : 1

1. It must not be confused or mixed up with vocational and technical education; nor with social service, work in farms or factories. It will certainly lead to vocational, technical, agricultural or industrial productivity. Work-experience must be treated as a basic subject of learning, like Arithmetic, Geography or Languages.
2. Work–experience should not be considered as a self-supporting or income fatching item for the school. Basic education failed because economic motive was built into it. Work-experience should be considered as laboratory of practical work, as in teaching of science. It will be the costliest dempartment in the school, and will require liberal funds. From the long range point of view, work experience will give rich dividends to the individual and the community.

1 V. Lakshmi Narayanan, "Introduction of work–experience in Indian Schools in 'NIE Journal', NCERT, New Delhi, January 1968 p. 5–6.

3. Work–experience is not an alternative to subjects which are supposed to require intelligence. Skill and intelligence are closely allied. The biggest fallacy is the belief that students who do not do well in theoretical subjects can be diverted to practical courses in vocational and technical subjects. Work-experience will benefit the gifted and talented student in direct proportion to his intellectual ability.
4. Work experience must not be a compulsory subject for examination and passing. Any compulsion will destroy the very roots of its philosophy. It should be given encouragement and incentive by giving additional credit as for sports and games. However, work-experience must be considered a curricular activity and not extracurricular.
5. Work-experience is knowledge and use of tools and labour–saving devices. Man is a tool-using animal.

Educational, Psychological, Social And Economic aspects of Work-Experience in Schools :

The follwing remarks made by Mr. M. D. Mobley, Executive Secretary of the American Vocational Association in one of his reports on the economy of the underdeveloped countries explain many things in few words.

"From my study of the economy of underdeveloped countries, I am convinced that one of the main reasons why they have low living standards is the attitude of their educated leaders towards work with hands." Educated Indians will have to change their attitudes towards manual work.

In the field of education many people in this country are still not quite prepared to believe that purely academic education, without reference to something constructive for a man to do in the economic life of a nation, is futile and frustrating. It is a fact that uncertainty, conflict and indecision have become the most important characteristic features of the educational policy of this nation. Everybody talks about self-suffciency and bridging the gap between manual and intellectual work. But hardly concrete steps have been taken. Effective implementation of work-experience programme can help a lot in achieving these goals.

From the educational point of view, greater concretness and reality can be given to the knowledge acquired by children through work–experience. Knowledge thus gained will be related to life. Most modern educationists today unanimously

agree with the idea of educating children through some suitable form of productive work. This activity is considered to be effective for providing integral all-sided education. Psychologically, work-experience is desirable because it relieves the children from the tyranny of a purely acedemic and theoretical learning.

From the social point of view, work-experiences will provide wide opportunities for active participation by all the children. It will help to break down the existing barriers of prejudice between manual and intellectual work. It will possitively help to cultivate a true sense of the dignity of labour. Economically considered, work-experience at a later stage will enable the pupils to increase their productive capacity as workers. They will have faith in precision and perfection. Work-experience will also help them to utilise their leisure advantageously. But here it must be clearly emphasised that the productive aspect should never be allowed to take precedence over the educational aspect.

In order to implement the programme of work-experience in our schools effectively, the follwoing steps should be taken :

1. Social climate should be created to accept the dignity of work. Still there are many people in our society, and many pupils in our schools, who are unwilling to do manual work which they consider to be low.
2. The teachers should be well-trained and pre-prepared to undertake these activities effectively.
3. The heads of the schools, the inspectorate staff and other administrators should be convinced about the usefulness and the importance of work-experience in our schools at various levels.
4. Work-experience should also be provided through programmes of community development and national reconstruction. Social Service camps can be organised to provide work-experience.
5. Some expert like Prof. S. K. Bose, Director of Indian Institute of Technology, Powai, Bombay, and others feel that the school leaving certificate at the end of the Xth standard should be given in two parts-the first dealing with academic attainment and the second in respect of the skill of work attained.
6. Work-experience cells should be established. Such cells should be created at state level for curriculum development, production of instructional material and training of personnel. The cells can also take up some research and experimen-

tation at a latter stage. A special wing should be set up in State Institute of Education for State level and in National Institute of Education at Central leval to implement the programmes of work-experience.

7. Attempts must be made to utilise all the resources available for this purpose.
8. The Khadi and Village Industrial Boards, The All India Handloom Boards, The Central Silk Boards, The Coir Board. the Small Industries Board and other such agencies should be involved in these programmes. Similary the help of the nearby Technical schools or I. T. I. (Industrial Training Institute) or Multipurpose school, Polytechnics, Engineering Colleges, Agricultural colleges, big Industrialists, big Farm owners, Local Government officials and others should be taken.
9. A Short-term and a long term programme for work - experience should be carefully prepared. Efforts must be made to implement the minimum programme of work- experience in all the schools without any further delay. This is a great challenge and it should be accepted.

Contents of Work-Experience; Work-Experience in the Lower Primary without Classes (1 to IV /V) :

The Education Commission has recommended that work experience in lower primary classes should take the form of simple handwork. The activities suggessted are paper-cutting, Cardboard-work, clay-spinning, simple needle-work, simple planting and kitchen gardening. Teachers should be encouraged and given guidance regarding corelation of these activeties with lessons in Science and Arithmetic. The students should be encouraged to make something which should be useful. Efforts should be made to develop their powers of observation and creativity, along with respect for manual work.

Work-Experience in The Higher Primary Classes : (IV/V-VII/VIII)

At this stage, the Commission has recommended to introduce work experience in the form of learning Crafts like cane and bamboo work, leather-work, pottery, needle-work, gardening, model-making, frotwork and work on farms.

Work-Experience In Lower Secondary Classes. (VII/VIII/-X) :

Work-experience at this stage should be productive. It should always be provided in real life situtation. It may also be in the form of workshop training.

Even a central workshop may be established to cater to the needs of a group of schools in a compact area.

The range of possible activities which can be adopted to provide productive work-experience is enormous and choice will be determined mainly on the availability of materials , and trained instructors. The list given below is purely indicative and the choice of activities would be made in the light of prevailing local conditions. Included in the list are also activities of special interest to girls or to schools in rural-areas : [1]

Lower Primary School :

Paper cutting, Cardboard cutting and folding, Modelling in Clay or plasticine, Spinning (Where natural in the environment) simple planting indoors or on plots, Kichen-gardening.

(a) Higher Primary School :

Cane and bamboo work, Leatherwork, Pottery, Needlework, Weaving, Gardenning, Model-making, Frotwork, Work on the farm.

(b) Lower Secondary School :

Woodwork, Simple metal work, Leatherwork, Coramics, Soapmaking, Tanning, Preserving, Weaving, Electrical repairs, Cookery, Model Making, simple scientific equipment, Classroom decoration, Carpet making, Bookbinding, Linecutting, Fabric Printing, Tailoring, Toy Making, Millienry, wood carving, Simple farm mechanics, Animal care, care of the soil, workshop practice.

(c) Higher Secondary School :

Many of the activities listed would be continued but the emphasis would shift to workshop practice or actual work experience in industrial or commercial concerns or on farms. The activities, would be oriented towards productive work. Skills demanded in woodwork, metal work and agriculture would be of a higher and more exact in nature.

Some illustrative activities of work-experience which can be organised in

1 Based on the Report of the Education Commission

schools are givin below by Shri Lakshmi Narayanan, Director of Birla Institute of Technology and Science, Pilani. The list is suggestive and by no means exhaustive.:

Gardening :

Growing : Plants; lawns and vegetable ornamental creepers, shrub and hedges, reck, gardens, fish ponds, garden statuary, fruit gardens and trees.

Farming :

Small plots of food crops, Oil seeds and cotton. Use of organic manuare and chemical fertilizer, insecticides and pesticides.

Cattle Farms :

Cows, buffaloes, sheep, goats and pigs. milk products, Poultry keeping, pet animals, bird-keeping and zoo.

Sports and Grounds :

Sports tracks : wrestling places, playgrounds, gymansium, swimming pool, Open-air theaters.

Construction Work :

Roads and pathways, Plastering, white-washing and painting of walls, small buildings and sheds, Cement concrete articles, Sanitation, drainage and waste-disposal, Flush latrines and septic tanks, facilities for bathing and washing clothes.

Wood Work :

Furniture for schools and houses, Polishing and carnishing and painting wood work Toys and frotwork, wood-carving.

Metal Work :

Wire and sheetmetal work, Tin and coppersmith's work, Brass Work.

Foundry :

Non-ferrous metal casting.

Machine Shop :

Simple, lathes. drilling machines, backsaws.

Mechanical Repairs :

Repairing and Overhauling of bicycles, sewing machines and type writers, Motor cycle and motor-car repairs and maintenance, Tractor repairs.

Watch Repairs :

Clock, watches and simple instruments.

Scientific Apparatus :

Making of Laboratory appartus, Demonstration equipment, Botanical and and physicological models, Herbanuim and Zoological museum.

Plastics :

Moulding small objects and toys.

Coramics :

Pottery and tiles and Arts Pieces.

Weaving :

Simple textiles, carpet weaving, Knitting and knit-wear.

Book-Binding :

Binding books and note-books.

Printing :

Simple printing presses, compositing, wood-block making.

Photography :

Developing, printing and enlarging.

Electrical :

Simple electrical wiring and illumination, Electrical appliances.

Electronics :

Assembling simple radio sets, Transistors.

Audio-Visual :

Cine-projectors and slide-projectors, Public address systems, Taperecorders.

Fine Arts :

Drawing, painting, Poster painting Signboard writing, display boards **Sculpture and clay.**

Leather-Work :

Making simple leather articles, shoe-repair.

Music :

Musical Instruments.

Tailoring :

Sewing, Cutting and tailoring.

Hair-Dressing :

Hair-cutting and hair-dressing.

Food-Preparation :

Bakery-Bread and pastry, Preserved food, Jams and pickkles. Fruit Juices.

Laundering :

Washing clothes, ironing. Dry-cleaning.

Every school should make a selected choice of manual, agricultural and industrial arts listed above depending upon its resources and local needs.

Students should be encouraged to use the shop facilities in the shcool for making articles for their own use. They should buy the material required and take with them the articles they manufacture.

Work-experience in schools will revolutionize the system of education, and increase the productivity in the farms, and factories. An immediate begining in selected schools in each area should be made. The money spent in providing the facilities required will repay ample dividends for generations to come.

Behavioural Changes Among Pupils Through Work-Experience Programmes

Any educational programme worth the name should produce some concrete results. The following behavioural changes are expected out of the Programme of work-Experience.[1]

A : KNOWLEDGE TO BE GAINED :

The pupils should know...

1. The problems and the needs of their own family, community, country and also of others related to the production.
2. The role of production in the development of a nation.
3. The role of science and technology with special reference to Industrial Revolution.
4. History of technology with special reference to Industrial Revolution.
5. Impact of technological development on the life of people.
6. The present and the future role of pupils in the development of the nation.
7. Production activities of their own country as well as of other countries.
8. The services involved in the production and distribution of manufactured goods.
9. The life of the people engaged in industry.
10. The raw material used in production activities, their sources, specifications, etc.
11. The tools, their parts, proper method of using, maintaining etc.
12. Safety precautions.
13. Factors contributing to productive effciency.
14. Selection and proper use of consumer goods.

B : Abilities to be Developed :

The pupils will devlop the following abilities through work experience.

1 (Adopted form 'Concept of Work Experience', NCERT. DELHI, 1970 PP. 38-41)

They Should :

1. Locate problems regarding production and consumption related to basic needs, namely health, food, shelter, clothing and cultural and recreational activities.
2. Formulate hypotheses regarding the soulution of the located problems.
3. Design experiments or production for the testing of the hypotheses.
4. Select the apparatus or tools for testing the hypotheses.
5. Actually test the hypotheses.
6. Evaluate the process of problem solving and products.
7. Feedback the results.
8. Undertake hard and consistent manual work.
9. Maintain inter-personal relations.

C : Attitudes to be Cultivated :

The pupils will be able to cultivate the following types of attitudes.
They should :

1. Realise that every citizen has a vital role in raising the productive capacity.
2. Consider every type of work promoting the welfare of the community as a dignified activity.
3. Have the same respect for the manual workers as one has for the intellctual workers .
4. Be keen on improving the tools and techniques of production and work.
5. Insist on perfection including precision.
6. Do every work methodically.
7. Avoid any kind of wastage.
8. Co-operate with others.

D : Interest to be Created :

The pupils will be able to create some of the following interests.
They should be interested in :

1. Raising the productive capacity of the nation.
2. Accepting even blue-collared jobs.
3. Taking full advantage of science and technology in improving vocation and daily life.
4. Living in co-operation with others.

A RELATIONAL STUDY OF HOME-ADJUSTMENT AND COLLEGE-ADJUSTMENT

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Abstract

The present study is designed to find out the nature of relationship subsisting between home-adjustment and college-adjustment of college-students. Two random samples of 133 and 200 students are selected from the populations of 203 and 335 students, studying in Pre. Uni. Year of Science and Arts in B. P. Baria Science Institute and S. B. Garda Arts College both of Navsari, respectively. The Seven-Point-Likert-Type-Scale having reliability Coefficient of ·92 and Index of reliability of ·96 is administered. Cofficients of correlation of·74 and ·61, between home-adjustment and college-adjustment of Science and Arts students, are respectively obtained. Difference between two *r*'s of Science and Arts students is found to be significant at ·05 level. It is established that there exists a positive and substantial relationship between home-adjustment and college-adjustment in Science and Arts students and the relationship so existing in Science-students is higher than that of Arts-students.

INTRODUCTION

Human life is a glorious saga of adjustments *ad libitum* through which an individual maintains the biological equilibrium and Psychological equipoise, in face of ecological confrontations and social *milieu* with which he is progressively enveloped, during his protracted excursion right from the cradle to the grave and these equilibria are a condition-precedent for a mundane existence and subsequent progression.

An infant, though with a fragmentary perception and mono-faceted abstraction, begins to learn to excercise a sort of control over himself and external stimuli which he is continually exposed to and adjust to. Horizon of his perception of objects and events he is confronted with widens gradually and the child with the assistance of adults around him effects an adjustment *pari passu* to situations that are in a state of flux. With biological growth and maturation coupled with psychological ones, an individual makes inroads into adolescence that transitionally spans childood and adulthood, Paving the way for the further development coherent and congruent and in that period percepts and concepts tend to assume more or less a crystalline form and integrate thereafter into more complex ones through which he secures positively possible adjustments.

An adolescent, being a social animal, is *ipso facto* a member of his family and circumstances permitting, he enrolls himself for prosecuting studies further in a college and for the amelioration of his temporal existence with the result that, at this stage, he faces a problem of adjustment at home as well as at college. And this proposition is amply substantiated by various researches.

Landis P. H. (1954) concluded that college-students faced the problems of adjustment in various areas such as home, education, society, vocation etc. Pasricha P. et. al. (1964) surveyed that students of Pre. Uni. Year of various colleges of M. S. University of Baroda had problems of adjusment. Ohnishi S. et. al. (1965) established that junior and senior high-school students faced similar problems. Moore T. (1966) inductively inferred that 80 % of the school-students ranging from 6 years to 11 years had problems of adjustment.

A student, without dubium, faces double-edged problem at home as well as at an educational institution. Putting up a greater quantum of endeavour, he assays

fairly well to cope with the proverbial problematic environment existing thereat and secures adjustment as much as possible. This has been supported by various studies that students who adjust well at home correspondingly adjust well at schools and colleges.

So far as identification with parents is concerned, Heilbrun A. B. (1962) found that the higher identification with the father was associated with better adjustment for college males and, more tentatively, higher indentification with the mother was associated with poorer adjustment for college females. Better habit pattern learnt at home entails better adjustment in school. This assertion is well supported by Torsten Husen (1963) who maintained that the children from homes with consistent and established habit pattern were better adjusted in school than did children from homes without such habit pattern. The kind of contact the child had with his mother was found to be a crucial factor. "A well-motivated contact in a setting of consistent and accepted rearing habits predisposes the child to adapt better at school."

Many more studies so registered established that adjustment at home exerted considerable quanta of influence over the student to secure adjustment in academic environment. Cervantes L. F. (1965) tested a hypothesis that in a lower-class matched sample, the family back ground of the dropout is less characterized by primary relationships than is the family back ground of the high school graduate. Using Broom and Selznick's testable criteria of primary relation as being one that is characterized by mutual acceptance as total persons, deep intercommunication and personal satisfaction derived from being in each other's company. This study found hypothesis sustained at a high level of statistical significance.

Negatively put, Jackson Lydia (1964) found that adolescent girls who refused to attend school harboured in their mind a strong ambivalent motner-daughter relationship. Gibbs D. N. (1965) exhibited that unsuccessful students showed an inadequate personal-social orientation. Factor analysis pointed to a 'failing orientation' which might be attributed to a sub-cultural clash between social skills, habits and attitudes learned in the home and those appropriated in the academic environment. Mitchell Sheila and Shepherd Michael (1967) demonstrated that dislike of school was associated partly with the signs of anxiety at home.

Reddi N. Y. (1967) concluded that boys from large families were signlficantly more maladjusted than those from medium-sized families who, in turn, were more maladjusted than those from small families.

Jalota S. (1964) registered the study, however with a different note, reporting that there was increasing satisfaction and dissatisfaction with the home and the school environment respectively with increase in age.

Kakkar Aruna (1965) studied the relationship between intelligence and adolescents, adjustment and reported that there was a positive relationship subsisting between intelligence and adjustment of students studying in std. XI in a high school. Sinha Durgananda (1966) supported, with corroborative testimony, that academic achievers were better adjusted than non-achievers.

From the above-cited researches, it is distinctly perceptible that the relational aspect of home-adjustment and college-adjustment is yet to be studied. Particularly this domain of research which turns out to be a logical corollary of previous studies has not attracted an attention of psychologists so far hence there is a *prima facie* case for a research in the said domain and the present authors launch an inquiry into inmost nature of relationship between home-adjustment and college-adjustment. The specific objective of the present paper is to test hypotheses mentioned in (a) and (b) under the rubric 'Statistical Design.'

METHODOLOGY

The Samples

203 students of Pre. Uni. Year of B. P. Baria Science Institute of Navsari and 335 students of Pre. Uni. Year of S. B. Garda Arts College of Navsari constitute populations.

'Probability Sampling' is adopted for the present problem. Sex distribution of each sample corresponds with that of corresponding population.

Following is the formula used for the selection of the samples :

$$n_0 = \frac{(Z\alpha)^2 \ (S)^2}{d^2} \quad \text{and}$$

$$n = \frac{n_0}{1 + \frac{n_0}{N}}$$

Where

n_0 = Initial sample size

$Z\alpha$ = Level of confidence[1]

S^2 = Heterogeneity[2]

d = Error[3]

n = Final sample size

N = Population

1 = Level of confidence = 95 %

2 = Heterogeneity = ·25 which is maximum

3 = Error = 5 %

The final sizes of samples of 133 students of Pre. Uni. Year of Science and 200 students of Pre. Uni. Year of Arts are determined by employing above-mentioned formula.

The members of the samples are selected from the populations by using 'Statistical tables for Biological, Agricultural and Medical Research' devised by R. A. Fisher and F. Yates.

Tool

For the present problem, the tool for collection of data is developed by the authors themselves. This tool is a Two-Dimensional-Seven-Point-Likert-Type-Self-Rating-Scale consisting of items pertaining to home-adjustment and college-adjustment.

For a try-out, it was administered to 40 students who were not the members of the samples but who belonged to the populations. Two try-outs were carried out.

To determine the reliability of the tool, The Split-Half Method is employed. Pearson's r found for those half-scales is ·86 and Reliability Coefficient then computed by Spearman-Brown prophecy formula is ·92.

Index of Reliability is ·96 which is the intrinsic Validity of the tool.

Statistical Design

The following hypotheses are to be tested by the statistical method stipulated in the sequel.

(a) H_1 is as follows :

"There exists a positive relationship between home-adjustment and college-adjustment of Science and Arts students, studying in Pre. Uni. Year."

(b) H_1 is as follows :

"The relationship between home-adjustment and college-adjustment of Science-students, studying in Pre. Uni. Year is higher than that of Arts-students, studying in the similar year."

Pearson's r's are obtained in order to find out the nature of relationship between home-adjustment and college-adjustment of Science and Arts students.

H_1 in (a) is tested against H_0, by using tabulated r's at ·05 and ·01 levels of significance, with corresponding *df.*

H_0 is as follows :

"There is no relationship subsisting between home-adjustment and college-adjustment in the populations of Science-students and Arts students."

H_1 in (b) is tested against H_0, by converting obtained r's into corresponding Fisher's Z function, determining the SE of the difference between two Z coefficients and finally arriving at a CR.

H_0 is as follows :

"The relationship between home-adjustment and college-adjustment of Science-students, studying in Pre. Uni. Year does not really differ from that of Arts-students, studying in the similar year."

Alternative hypotheses would be tested by the Z test, if required.

RESULTS AND DISCUSSION

As mentioned, the objective of the present study was to find out the nature of relationship between home-adjustment and college adjustment of college-students. For the purpose, coefficients of correlation are computed and presented, alongwith other statistical criteria essential for testing of hypothesis, in Table 1.

Table 1

Showing correlation between home-adjustment and college-adjustment of Science and Arts Students and tabulated r's at ·05 and ·01 levels of significance with corresponding *degrees of freedom*

	r	$\left(\frac{df}{n-2}\right)$	Tabulated r at ·05 level of significance	Tabulated r at ·01 level of significance
Science-students	·74	131	·170	·223*
Arts-students	·61	198	·139	·182*

From table 1, it is clearly perceptible that the coefficient of correlation between home-adjustment and college-adjustment of Science-students is ·74. Significance of an obtained r is tested against H_0 that ρ(rho) = 0. Our r = ·74 and N = 133. For 131 *df*, tabulated r's at ·05 and ·01 are, by linear interpolation, ·17 and ·22 respectively. This means that only five times in 100 trials would an r as large as ± ·17 arise from fluctuations of sampling alone if the ρ(rho) were actually ·00; and only once in 100 trials would an r as large as ± ·22 appear if the ρ(rho) were ·00. It is clear that the obtained r of ·74, since it is much larger than ·22, is highly significant i. e. at the ·01 level. Hence H_0 is discarded and H_1 in (a) for Science-students is accepted. The obtained r is positive and substantial.

And the coefficient of correlation between home-adjustment and college-adjustment of Arts-students is ·61. Significance of an obtained r tested against H_0 that ρ (rho) = 0. Our r = ·61 and N = 200. For 198 *df*, tabulated r's at ·05 and ·01 are, by linear interpolation, ·14 and ·18 respectively. This means that only five times in 100 trials would an r as large as ± ·14 arise from fluctuations of sampling alone If the ρ (rho) were actually ·00; and only once in 100 trials would an r as large as ± ·18 appear if the ρ (rho) were ·00, It is clear that the obtained r of ·61, since it is much larger than ·18, is highly significant, i. e. at the ·01 level. Hence H_0 is discarded and H_1 in (a) for Arts-students is accepted. The obtained r is positive and substantial.

We may therefore conclude that H_1 in (a) is accepted *in toto*.

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* Highly Significant, i. e. at ·01 level

In order to test the significance of difference between two obtained r's, the r's are converted into Fisher's Z's, the standard error of difference between two coefficients is determined and critical ratio is obtained. All this is presented in Table 2.

Table 2

Showing Correlation between home-adjustment and college-adjustment of Science and Arts students and corresponding Fisher's Z function, Standard Error of difference between Z's and Critical Ratio

	r	Fisher's Z function	σDZ	CR
Science-students	·74	·95		
			0·11	2·18*
Arts-students	·61	·71		

It is clearly perceptible from Table 2 that coefficient of correlation between home-adjustment and college-adjustment of Sciene-students is ·74 whereas that of Arts-students is ·61 and those r's are then converted into Fisher's Z's which are ·95 and ·71 respectively. σDZ so obtained is ·11 and CR is 2·18 which is above 1·96 but far below 2·58 hence the difference between two r's is significant at the ·05 level. We may accordingly reject H_0 and accept H_1 in (b).

But the blanket rejection of H_0 doesnot necessarily compel for the acceptance of H_1. H_2 i. e. "The relationship between home-adjustment and college-adjustment of Science-student, studying in Pre. Uni. Year is less than that of Arts-students, studying in the similar year." which is not stated so far is very much in the run for its possible acceptance.

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* significant at ·05 level

If we designate populations of Science-students and Arts-students, respectively then H_0, H_1 and H_2 would run as follows :

$$H_0 : p_1 - p_2 = 0.$$
$$H_1 : p_1 > p_2$$
$$H_2 : p_1 < p_2$$

As the Fisher tranformation of r is normally distributed, the unit normal deviate, Z, is an appropriate test statistic.

$\alpha = .05$ and $Z = 2.18$.

Z, being 2.18, is greater than 1.96 and falls into the upper part of Critical Region. This entails not oniy the rejection of H_0 but H_2 as well.

$H_2 : p_1 < p_2$ is discarded with the result that the finality of acceptance of H_1 $p_1 > p_2$ is accomplished.

Ohnishi et. al. (1965) and Moore (1966) asserted that school-children, junior as well as senior, had the problems of adjustment and Landis (1954) and Pasricha et. al. (1964) concluded that college-students faced similar problems. The present study substantiates the said proposition since it establishes positive and substantial relationship between home-adjustment and college-adjustment and a problem invariably precedes an adjustment.

By putting stress on one focus or the other of the several *foci* of the problem, Heilbrun (1962), Torsten Husen (1963) and Cervantes (1965) demonstrated affirmatively and Jackson Lydia (1964), Mitchell Sheila and Shepherd Michael (1967) and Reddi (1967) concluded negatively that the better adiustment at home entails the better adjustment at school and students who did not adjust at home did not adjust at school too, respectively.

The conclusion drawn by Jalota (1964) is not confirmed probably because he seemed to have ventured to cover more areas of adjustment than does the present study.

Kakkar Aruna (1965) reported that there subsists positive correlation between intelligence and adjustment of adolescents studying in std. XI and Sinha Durgananda (1966) purported that academic achievers at the university level adjust better than do

non-achievers. Here in the present study the relationship between home-adjusment and college-adjusment of the Science-students is higher than that of Arts-students; both the samples significantly differ and r of Science-students is greater than that of Arts-students; and, as far as the rule-of-thumb goes, one can, without violating sanctity of common observation, presume that high-achievers rather than low ones in S. S. C. Examination have relatively easier access to the portal of Science-college in academic firmament hence the mean intelligence and mean academic performance of Science-students are greater than those of Arts-students. Should this be postulated then the findings of this study are, in a way, in consonance with what Sinha asserted, though variables studied by him and these authors resemble indiscriminately and vary a good deal with *genus* and *species* of the problem respectively and it is in the domain of the *species* that this study ceremoniously strives for the positive contribution.

CONCLUSIONS

The hypotheses so posited by the authors were partly evolved out and partly suggested by the previous studies so reported. These hypotheses are categorically accepted so we may logically arrive at conclusions which are restrictively confined to B. P. Baria Science Institute and S. B. Garda Arts College both of Navsari.

The conclusions are as follows :

(1) There exists a positive and substantial relationship between home-adjustment and college-adjustment of Science and Arts students, studying in Pre. Uni. Year.

(2) The relationship between home-adjustment and college-adjustment of Science -students, studying in Pre. Uni. Year is higher than that of Arts-students, studying in the similar year.

Moreover the present study categorically indicates that still there is an ample room for further research in the same domain but pertaining to under-graduate as well as post-graduate students.

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8

SPECTROPHOTOMETRIC STUDIES ON FE (III)–5 ETHYLRESACETOPHENONE COMPLEX :

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Abstract

(Ferric ion forms reddish–violet coloured water soluble complex with 5–ethylresacetophenone (ERAP) in the pH range 2.0 to 3.0 The complex shows maximum absorbance at 475 nm and at pH 2.9 to 3.0. The composition of the complex is 1 : 1 as indicated by Job, Slope ratio and mole ratio methods).

Various workers [1-2] have studied the complexes of 2 : 4 dihydroxyketones with iron (III) ions. However, 5–ERAP has not so far been investigated as an analytical reagent for iron (III) ions. In the present work, the study of the reaction between iron (III) ion and 5–ERAP and the use of the latter as a specific reagent for the spectrophotometric determination of iron (III) ion have been studied.

A study of the composition of the complex by (1) Job's method of continuous variation[3], (2) Yoe and Jone's mole ratio method[4] and (3) Harvey and Manning's slope ratio method[5] suggested that the complex formed has a 1:1 composition.

Experimental :–

Apparatus :– The absorption spectra were recorded on a Bausch and Lomb spectronic–20, regulated model–spectrophotometer. A Beckman pH meter, Model M-2, was used for all pH measurements.

** This paper forms a part of M. Phil. Dissertatation of Shri A.C. Desai.

Reagent :

5-ERAP was prepared from 4-ethylresorcinol[6] by heating it (7.5 g.) with fused zinc chloride (20.0 g,) in glacial acetic acid (30.0 ml.) The reaction mixture was boiled and then treated with ice after the addition of 100 ml. of cold 50% hydrochloric acid. The product 5-ERAP (5.2 g,) was crystallised from hot benzene as rhombic plates, m.p. 119°.

A solution of the ketone in 50% ethanol was used in all the experiments.

Properties of iron (III) 5-ERAP complex :-The ketone forms a reddish-violet coloured complex with iron (III) ion between pH 2.0 and 3.0 The complex formed between pH range 2.9-3.0 was found to be highly stable.

Nature of the complex :- The absorption spectra of mixtures of equimolar solutions of ferric nitrate and the ketone in the ratios 1:1, 1:2. 1:3 at different pH values were measured between 400-625 nm. At pH 2.95 maximum absorption of the complex was found to be at 475 nm for all the mixtures. This suggested that under the condition of the study, the reagent forms only one complex with iron (III) ions.

Composition of the complex :-

Job's method :-Optical densities of the solution prepared by mixing x ml. of 0.01 M the ketone solution with (12-x) ml, of 0.01 M ferric nirate solution were measured at 475 nm. The final volume of the mixture was made to 50 ml. with distilled water. Job's method of continuous variation was studied at pH 2.0, 2.5 2.8, 2.95 and 3.0 The absorption due to ferric nitrate and the ketone solutions at this wave-length is negligible. The optical densities were plotted against the composition of the coloured solutions. At any pH between 2.00 and 3.00, the curves showed peaks when the molar ratio of the metal to ligand was 1:1. The plot (fig.[1]) shows that the molar ratio of the metal to ligand is 1:1 at pH 2.95.

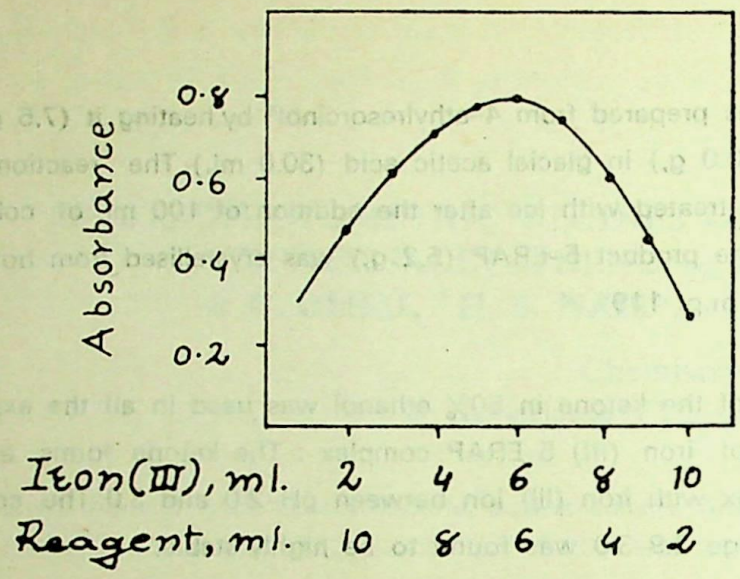
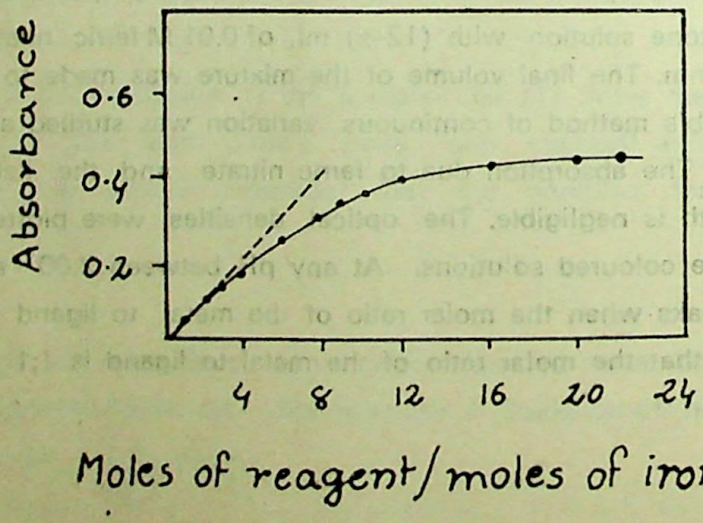


Fig-1

Fig.1. Composition of the iron (III) –5–ERAP complex at pH 2.95 by Job's method of continuous variation at 475 nm. x ml. of 0.01 M iron (III) nitrate + (12–x) ml. of the ketone + 5.0 ml, of 1 M sodium nitrate; final volume 50 ml.

Mole ratio method :–The empirical formula of the complex in solution was also determined by mole ratio method. Using equimolecular solution of the iron (III) nitrate and the ketone, series of solutions having the ratio of iron (III) nitrate to the reagent varying from 1:10 to 2:1 were prepared at pH 2.95 and their absorbance was measured at 475 nm. The plot (fig. 2) shows that the molar ratio of iron (III) to the reagent for constant maximum absorbance to be 1:2 and the plot is straight line upto the molar composition 1:1, so, it bends.



Fig–2

Fig.2. Molar composition of iron (III)-5-ERAP complex at pH 2.95 by the mole ratio method at 475 nm, μ=0.1 M sodium nitrate. 2 ml. of 0.01 M iron (III) nitrate and varying amounts of 0.01 M the ketone were mixed and the final volume made up to 25 ml.

Slope ratio method :-Two series of solutions were prepared. In one series the concentration of the iron (III) ion was varied and that of the reagent was kept constant, taking care to see that sufficient excess of the reagent was present to make the dissociation negligible. In the other, the concentration of the reagent was varied and that of the iron (III) ion was kept constant. The absorbance of both the series were determined at pH 2.95 In both the series, the ionic strength of the solution was maintained at 0.1 M by the addition of 1 M sodium nitrate solution The plots (fig.3) obtained are parallel lines and therefore, the slopes have the same value indicating thereby that the molar composition of the complex is 1:1.

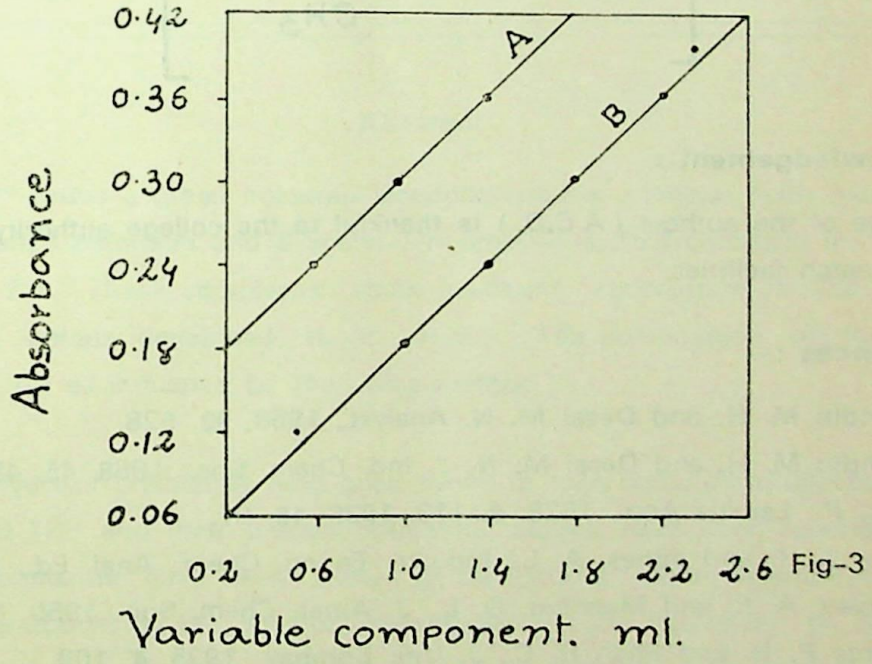


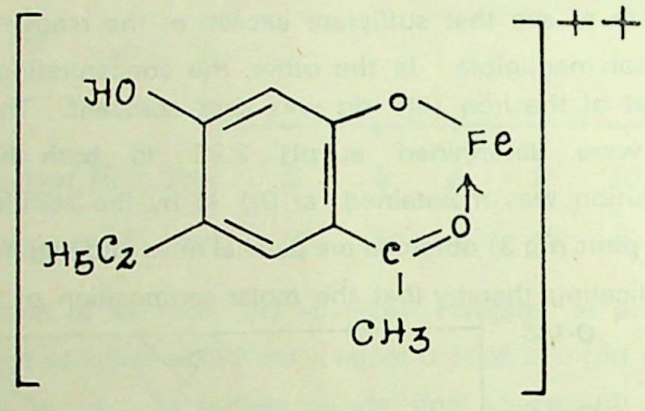
Fig-3

Fig. 3. Molar composition of iron (III) – 5 ERAP complex at pH 2.95 by the slope ratio method at 475 nm. μ = 0.1 M sodium nitrate.

(A) 0.01 M iron (III) nitrate (0.2 *to* 2 4 ml.) was added to 10.0 ml. of 0.01 M 5 – ERAP; and

(B) 0.01 M the ketone solution (0.2 *to* 2.4 ml.) was added to 10.0 ml. of 0.01 M iron (III) nitrate. Final volume in each case was 50.0 ml.

5 – ERAP possesses an acidic 0H group in ortho position to a corresponding keto (>CO) group. Therefore this compound may form a six membered chelate ring in which the Fe (III) atom replaces the hydroxyl hydrogen atom, and is in turn co-ordinated to the carbonyl oxygen atom. The structure of the complex may be written as



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SPECTROPHOTOMETRIC STUDIES OF CU^{+2}-COMPLEX FORMATION WITH (6 – ACETYL- 5- HYDROXY –) AND (8 – ACETYL 7 – HYDROXY –) 4-METHYL COUMARINS.

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Abstract

($Copper^{+2}$ forms a green coloured alcoholic–soluble complex with 6–acetyl–5–hydroxy–4–methyl coumarin and 8–acetyl–7–hydroxy–4–methyl coumarin in the pH range 6.9 to 7.8. These complexes show maximum absorbance at 380 nm and the strongest colour developed is at pH 7·3. The composition of the above complexes is 1:2 as indicated by the Job's method).

Ortho–dihydroxy coumarins have been found to form coloured soluble complexes with Fe^{+3} and Ti^{+4} and their spectrophotometric studies have been reported[1]. Such substituted coumarins have been shown to be good chelating agents[2]. 6–Acetyl isomer was prepared by the method investigated in this laboratory by Shah and the 8–acetyl isomer by the known method[3]. These coumarins form alcoholic–soluble coloured complexes with cupric and ferric ions and hence the spectrophotometric study of such complex formation with the former has been investigated.

A study of the composition of the complex by the Job's method of continuous variation[4] shows that complexes formed by them have 1:2 composition.

* This work forms a part of M. Phil, Dissertation of A.R. Shah.

Experimental :-

The absorption spectra were recorded on a Bausch and Lomb spectronic-20, Regulated Model-spectrophotometer. A Beckman pH-meter, Model M-2, was used for all pH determinations.

The solutions of the 6-acetyl isomer and 8-acetyl isomer in absolute alcohol were used in all the experiments.

The absorption curves of both the coumarins are similar in nature giving the maximum absorbance at 380 nm as shown in fig. 1.

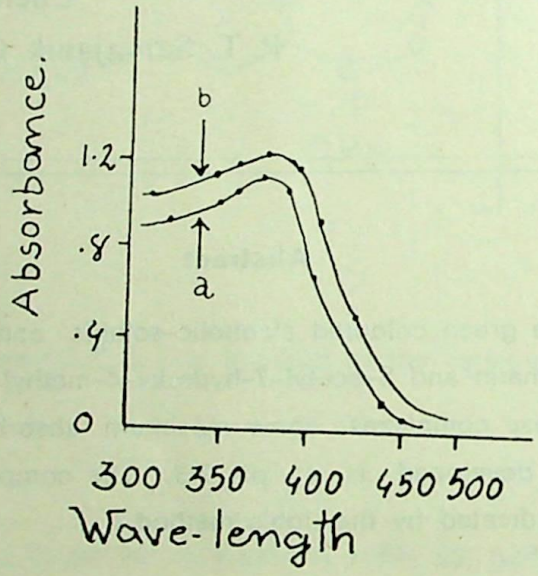


Fig-1

Fig. 1. The spectral characteristic of Cu^{+2} – with both the isomers shows complex formation at pH 7.3. (2.0 ml. 0.01 M cupric chloride + 6.0 ml. 0 01 M 6-/8- isomer, final volume 25 ml. for 6-isomer (a) and 50 ml for 8-isomer (b)).

Nature Of The Complex :

The absorption spectra of mixtures of equimolar solutions of cupric chloride and 6 – or 8 – isomer in the ratios 1 : 1, 1 : 2 and 1 : 3 at different pH values were measured between 340 – 580 nm. At pH 7.3 the maximum absorption of comlexes was found to be at 380 nm for all the mixtures. This suggested that, under the condition of the study, the 6 – and 8 – isomers form only one complex with Cu^{+2} – ions.

Composition Of The Complex :

Job's method :–Optical densities of the solutions, prepared by mixing x/10 ml. of 0.01 M of the 6 – isomer or 8 - isomer solutions with (1.2 – x/10) ml. of 0.01 M cupric chloride solutions were measured at 380 nm. The final volume of the mixture was made to definite volume with 50% alcohol. The pH of the solutions was adjusted by the addition of sodium accetate solution. Job's method of contjnuous variation was studied at pH 6.9, 7.1 7.3, 7.5 and 7.7. The optical densities were plotted against the composition of the coloured solutions. At pH 7.3, the curves showed peaks when molar ratio of the metal to ligand was 1 to 2 as shown in fig. 2.

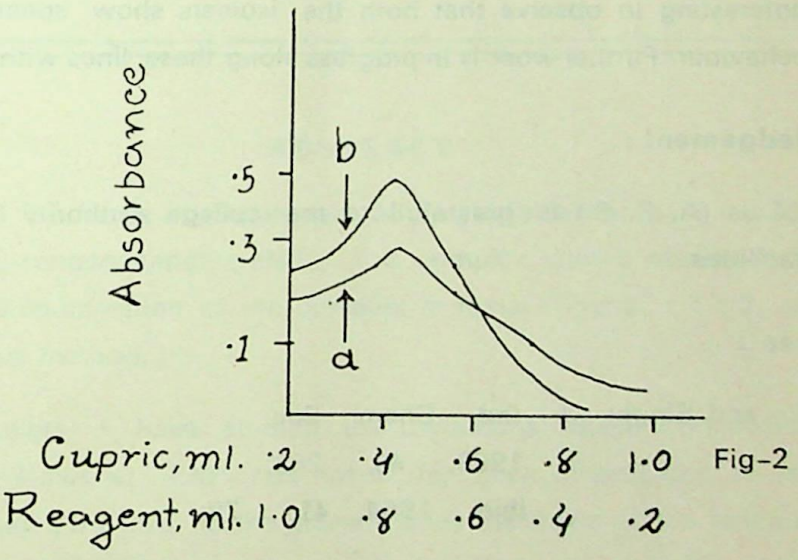
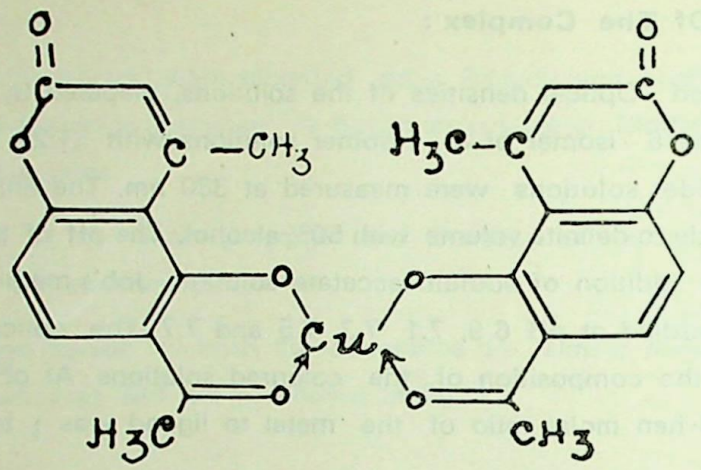


Fig-2

Fig. 2. Composition of the Cu^{+2} – 6 – /8 – isomer at pH 7.3 by the Job's method of continuous variation at 380 nm (x/10m1. of 0.01 M cupric chloride + (1.2 – x/10) ml. of the 0.01M reagent. Final volume was made to 25 ml. for 6 – isomer (a) and 50 ml. for 8 - isomer (b)).

The complex formation seems to take place through the hydroxyl and the ketonic group of each isomer as follows.



It is interesting to observe that both the isomers show spectrophotometrically identical behaviour. Further work is in progress along these lines with iron and titanium

Acknowledgement :

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SPECTROPHOTOMETRIC STUDIES ON Co (II)-5-ETHOXY -2-NITROSOPHENOL COMPLEX

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ABSTRACT

[Cobalt (II) ion forms a red coloured 50 % glacial acetic acid soluble complex with 5-ethoxy-2-nitrosophenol (ENP). The complex shows maximum absorbance at 390 nm. The composition of the complex is metal : ligand : : 1 : 2, as indicated by the mole ratio method.]

Various workers[1-4] have studied the transitional metal complexes of ortho-nitrosophenols. However, ENP has not so far been investigated as an analytical reagent for Cobalt (II) ions. In the present work the study of the reaction between Cobalt (II) ion and ENP and the use of the latter as a specific reagent for the spectrophotometric determination of Cobalt (II) ion have been included.

A study of the composition of the complex by (1) Yoe and Jone's mole ratio method[5] and (2) Harvey and Manning's slope ratio method[6] indicates that the metal to ligand mole ratio is 1;2.

EXPERIMENTAL

Apparatus : The absorption spectra were recorded on a Bausch and Lomb Spectronic-20, Regulated Model-Spectrophotometer.

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Reagent : A solution of the reagent ENP in glacial acetic acid was used in all the experiments.

Nature Of The Complex : The absorption spectra of mixtures of equimolar solutions of cobalt nitrate and the ENP in the ratios 1 : 1, 1 : 2 and 1 : 3 were measured between 340-595 nm. The maximum absorption of the complex was found to be at 390 nm for all the mixtures. This indicates that, under the condition of the study the ENP forms only one complex with Cobalt (II) ions.

COMPOSITION OF THE COMPLEX :

Mole ratio method : The empirical formula of the complex in solution was determined by the mole ratio method. Using equimolar solutions of Cobalt (II) nitrate and the ENP; series of solutions having the ratio of cobalt nitrate to the reagent varying from 1 : 6 to 3 : 1 were prepared and their absorbance was measured at 390 nm.

The plot (fig. 1) is a straight line upto the metal to ligand mole ratio 1 : 2 (0.3 : 0.6 ml) and then the constant maximum absorbance is observed.

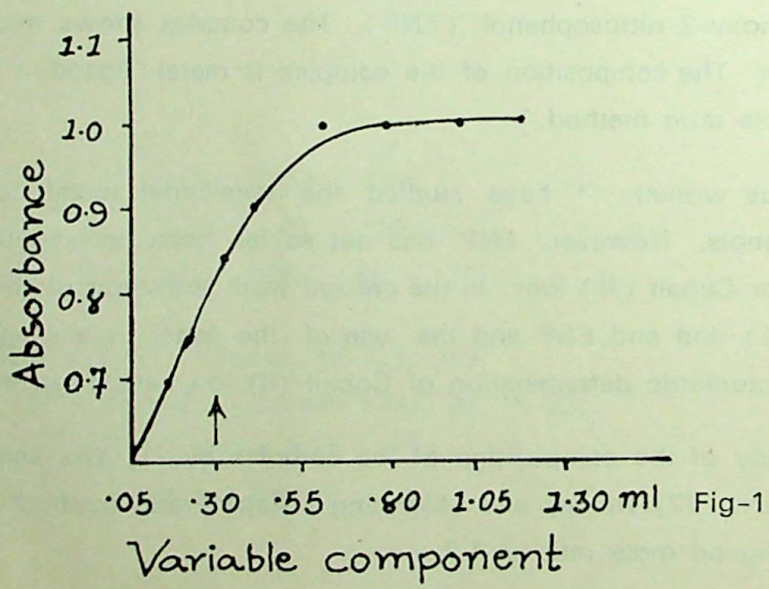
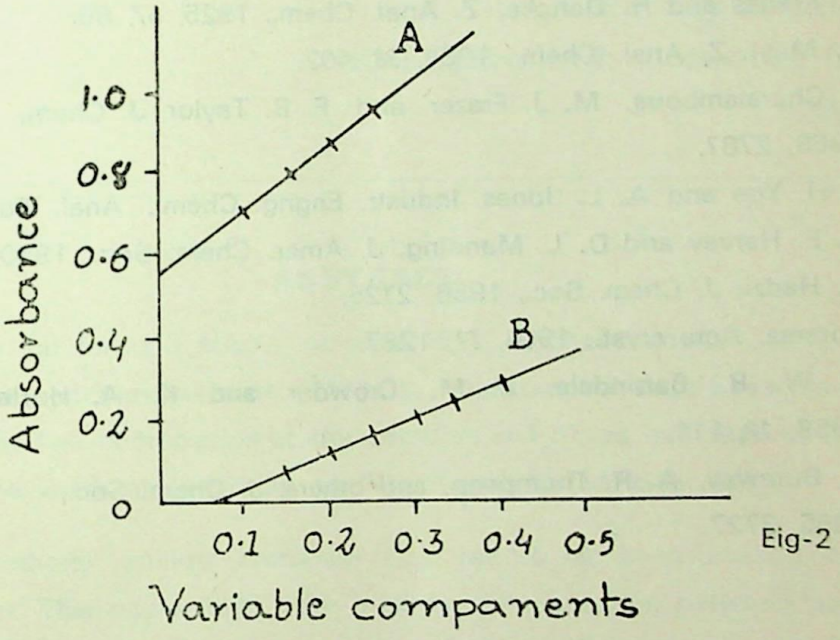


Fig-1

Fig. 1 Molar compositlon of Cobalt (II)-ENP complex by the mole ratio method at 390 nm. [0.6 ml. of 0.01 M reagent and varying amounts of 0.01 M cobalt nitrate (0 05-1.8 ml) were mixed and the final volume made upto 30 ml. with 50% glacial acetic acid.]

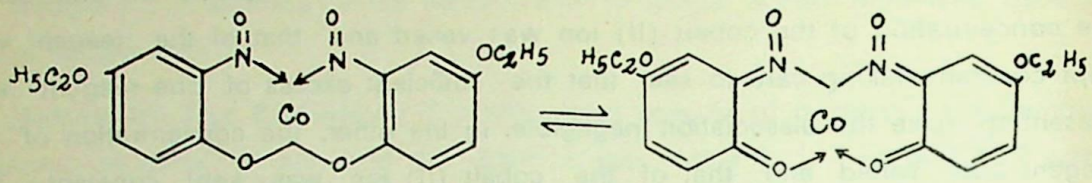
Slope ratio method : Two series of solutions were prepared. In one series the concentration of the cobalt (II) ion was varied and that of the reagent was kept constant, taking care to see that the sufficient excess of the reagent was present to make the dissociation negligible. In the other, the concentration of the reagent was varied and that of the cobalt (II) ion was kept constant. The absorbances of both the series were determined. The plots (fig. 2) were obtained having the slope ratio 1 : 2 ($\frac{\text{slope A}}{\text{slope B}} = \frac{0.16}{0.08}$) indicating thereby that the metal to reagent mole ratio is 1 to 2.



Eig-2

Fig. 2. Molar composition of cobalt (II) – ENP complex by the slope ratio method at 390 nm. [(A) 0.01 M cobalt nitrate (0. 05 to 0.50 ml) was added to 2.0 ml. of 0.01 M ENP; and (B) 0.01 M the reagent solution (0.05 to 0.50 ml.) was added to 2.0 ml. of 0.01 M cobalt nitrate. Final volume in each case was 80 ml.]

It is well established [7-10] that 2-nitrosophenols are tautomeric with the monoximes of ortho-benzoquinones. The chelate compounds formed by replacing the proton in this tautomeric system by a cobalt can be represented in valence-bond terms as involving resonance between structures (I) and (II).



(I) (II)

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SPECTROPHOTOMETRIC STUDIES OF COPPER (II)-ETHYL -B-2-METHOXY-ANILINO CROTONATE COMPLEX :

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ABSTRACT

(Copper (II) ion forms a purple coloured 50% alcoholic soluble complex with ethyl-B-2-methoxy-anilino crotonate (EMAC). The complex shows maximum absorbance at 545 nm. The composition of the complex is 1 : 1 as indicated by the mole ratio method. The value of extinction coefficient was found to be 450).

Ethyl-B-2-methoxy anilino crotonate has not so far been investigated as an analytical reagent. This paper deals with a study of the reaction between copper (II) ions and the EMAC and the use of the latter as a specific reagent for the spectrophotometric determination of copper. A study of the composition of the complex by (1) Job's method of continuous variation,[1] (2) Yoe and Jone's mole ratio method[2] and (3) Harvey and Manning's slope ratio method[3] indicates that the complex formed has a 1 : 1 composition.

EXPERIMENTAL

Apparatus

The absorption spectra were recorded on a Bausch and Lomb Spectronic-20, Regulated Model-Spectrophotometer. A Beckman pH meter, Model M-2, was used for the pH measurements.

* This paper forms a part of M. Phil Dissertation of Shri A. C. Desai.

Reagent

The EMAC was synthesised by condensing freshly distilled ortho-anisidine (0.03M) with pure ethyl acetoacetate (0.033M) in presence of a drop of concentrated hydrochloric acid. The reaction was allowed to proceed at room temperature for 48 hours in a dessicator. The resulting crude crotonate was purified by washing it with a 10% solution of hydrochloric acid (40ml), then with a saturated solution of sodium chloride (40ml.) and was subsequently dried over anhydrous calcium chloride. Solutions of EMAC and $CuC1_2;2H_20$(BDH) in absolute alcohol were used in all the experiments.

Properties of the Copper (II)-EMAC Complex :

The EMAC forms a unstable reddish-violet coloured complex with copper (II) ion below pH 3.8. The stable purple coloured complex was formed between pH 6.0. to 8.0.

Nature of the Complex :

The absorption spectra of mixtures of equimolar solutions of copper (II) chloride and the EMAC in the ratios 1 : 1, 1 : 2 and 1 : 3 were measured betweeu 340-600 nm. The maximum absorption of the complex was found to be at 545 nm for all the mixtures. This Suggested that, under the condition of the study, the EMAC reagent forms only one complex with copper (II) ions.

Composition of The Complex :

Job's method-Optical densities of the solutions prepared by mixing x/10 ml. of 0.01M the EMAC solution with (1.2-x/10) ml. of 0.01M copper (II) chloride solution were measured at 545 nm. The final volume of the mixture was made to 8.0 ml. with 50% alcohol. The optical densities were plotted against the composition of

the coloured solution. The plot (fig. 1) shows that the molar ratio of the metal to ligand is 1 : 1.

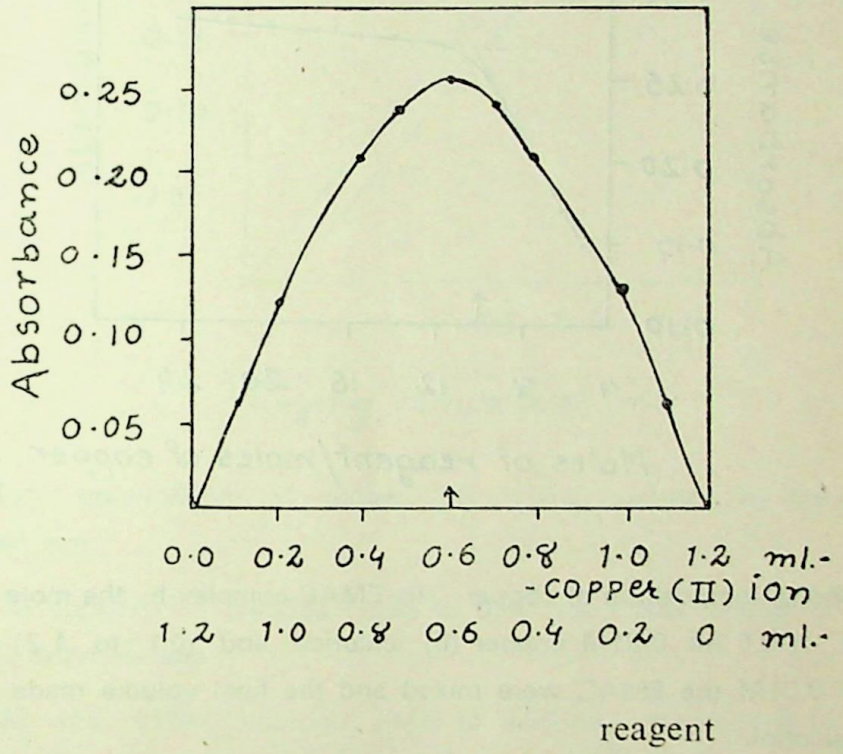

Fig. 1 Composition of the copper (II) EMAC of the complex by Job's method of continuous variation at 545 nm. (x/10 ml. of 0.01M copper chloride + (1.2 – x/10) ml. of the 0.01M EMAC + 6.8 ml. 50% alcohol).

Mole ratio method : The empirical formula of the complex in solution was also determined by the mole ratio method. Using equimolar solutions of the copper (II) chloride and the EMAC, series of solutions having the ratio of copper (II) chloride to the reagent varying from 1 : 5 to 12 : 5 were prepared and their absorbance was measured at 545 nm. The plot (fig. 2) shows that, the plot is a straight line upto the molar composition of metal to the reagent EMAC, 1 to 1; and then it shows constant maximum absorbance.

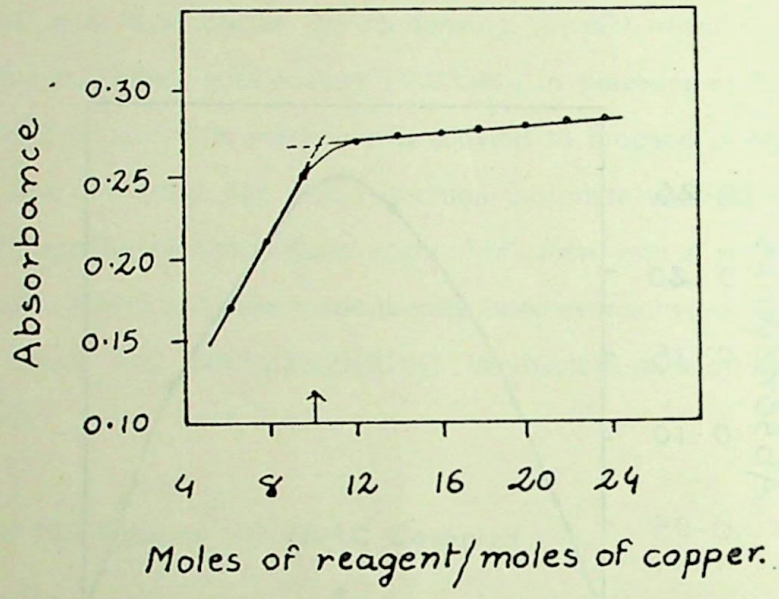

Fig. 2 Molar composition of copper (II)–EMAC complex by the mole ratio method at 545 nm. (0.5 ml. 0.01M copper (II) chloride and (0.1 to 1.2) ml. varying amounts of 0.01M the EMAC were mixed and the final volume made upto 8.0 ml, with 50% alcohol.

Slope ratio method : Two series of solutions were prepared. In one series, the concentration of the copper (II) ion was varied and that of the reagent was kept constant, taking care to see that sufficient excess of the reagent was present to make the dissociation negligible. In the other, the concentration of the reagent was varied and that of the copper (II) ion was kept constant. The optical densities were plotted against the variable component. The plots (fig. 3) obtained are parallel lines and therefore the slopes have the same value indicating thereby the molar composition of the complex 1 to 1.

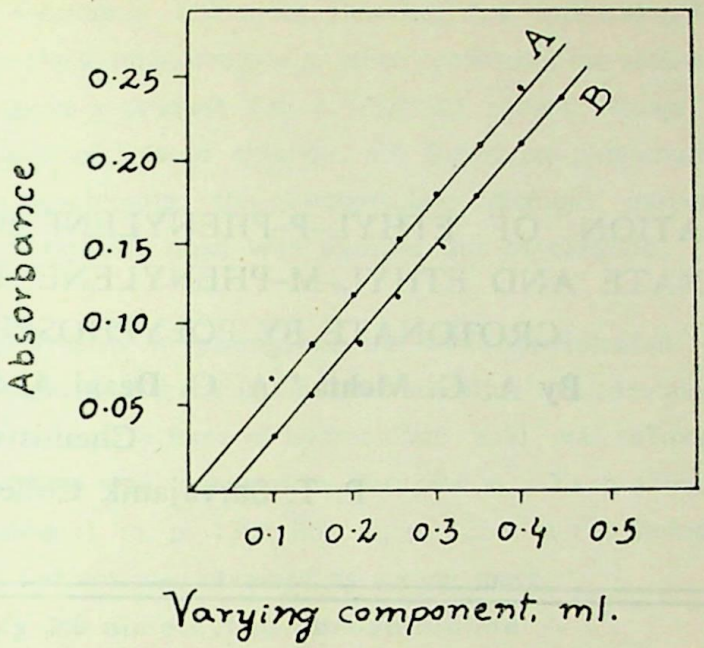

Fig. 3 Molar composition of copper (II)-EMAC complex by the slope ratio method at 545 nm.

(A) 0.01M copper (II) chloride (0.05 to 0.50 ml.) was added to 2.5 ml, of 0.01M EMAC solution and

(B) 0.01M the EMAC solution (0.05 to 0.50 ml.) was added to 2.5 ml. of 0.01M copper (II) chloride solution. Final volume in each case was 8.0ml. with 50% alcohol.

Acknowledgement ;

One of us (A. C. D,) is thankful to the college authority for providing the research facilities.

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CYCLISATION OF ETHYL-P-PHENYLENE-BIS-β-AMINO CROTONATE AND ETHYL-M-PHENYLENE-BIS-β-AMINO CROTONATE BY POLYPHOSPHORIC ACID.

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SURAT.

Bis-β-aminocrotonates of p-and m-phenylenediamines have been prepared and cyclised to corresponding dihydroxy phenanthrolines by polyphosphoric acid.

An extensive work has been done by Bangadiwala and Desai [1] on the synthesis of 4-hydroxy quinolines using acetic anhydride and sulphuric acid. With each of p-and m-phenylenediamines (one mole) and two moles of ethyl aceto-acetate, Backeberg[2] obtained ethyl p-phenylene-bis-β-amino crotonate and ethyl m-phenylene-bis-β-amino crotonate respectively, which he failed to cyclise by the Conrad-Limpach thermal method. Kermack et. al[3]. however, achieved the double cyclisation by using Price-Robert's synthesis,[4] obtaining corresponding di-hydroxy phenanthrolines. In extension of their work on the synthesis of 4-hydroxy quinolines Bangadiwala and Desai tried to cyclise the above bis-crotonates with acetic anhydride and sulphuric acid, but the attempts failed[5].

In the present investigation, the modified method of cyclisation of ethyl-β-arylamino crotonates and ethyl-*B*-Phenyl-*B*-aryl amino acrylates with polyphosphoric acid, developed by Desai and Desai[6], has been successful in achieving double cyclisation of the above bis-crotonates yielding 4:5 dihydroxy 2:7 dimethyl-p-phenanthroline and 4:8 dihydroxy 2:6 dimethyl-m-phenanthroline in more than 50 % yield. These dihydroxy phenanthrolines do not give the usual purple colour with alcoholic ferric

* This paper forms a part of M. Phil. Dissertation of A. G. Mehta.

chloride given by 4-hydroxy quinolines. However, it is interesting to observe that ethyl-p- phenylene-bis-β-aminocrotonate, when cyclised by the variation in the above p. p. a. method, gives a product (m. p. 252° C) which shows intense violet colouration with alcoholic ferric chloride. 4:5- Dihydroxy-p-phenanthroline gives with phosphorous oxychloride; the corresponding dichloro derivative but this compound does not similarly react with phosphorous oxychloride.

Experimental :

Ethyl-p-and m-phenylene-bis-aminocrotonates :—

A solution of diamine (each 0.055 M) and ethyl acetoacetate (0.11 M) in ethyl acetate (25 ml) with a trace of hydrochloric acid was refluxed for 2 hours, and then ethyl acetate was removed by evaporation. The p-aminocrotonate was crystallised from alcohol m. p. 135°; lit[2], m. p 135°. m-Bis-amino-crotonate on evaporation of the solvent was obtained as syrupy mass.

4 : 8 dihydroxy 2:6 dimethyl m-phenanthroline :—

The m-bis-amino-crotonate (6·0 g.) was heated with p. p. a. (H_3PO_4 24 ml: pentoxide 40.g) gradually to 140° C and kept at this temperature for half an hour The reaction mass was decomposed with ice water, neutralised and the product crystallised from alcohol. m. p. 360°; lit[5]; 360-362° (decomp.). It does not give with ferric chloride purple colour. It's dichloro derivative was prepared by refluxing it with phosphorous oxychloride; m. p. 172°, lit[5]; 170-172°C.

4 : 5 dihydroxy 2 : 7 dimethyl-p-phenanthroline :—

The p-bis-aminocrotonate (6.0 g.) was heated with p. p. a. (H_3PO_4 24 ml. pentoxide 40. g) to 120° slowly and then the mixture was kept in desiccator overnight. Nextday it was heated to 145-150°. It was cooled and decomposed with ice. The product was crystallised from aqueous alcohol (70 %) m. p. 345°; lit 345°. It does not give with alcoholic ferric chloride purple colour. It's dichloro derivative was prepared by refluxing it with phosphorous oxychloride for two hours and crystallised from alcohol m. p. 185°; lit[5]; m. p. 184-185°.

Variation of heat treatment with p. p. a. :-

The above p-bis-aminocrotonate (6.0 g) was heated with p. p. a. (H_3PO_4 24 ml. pentoxide 40 g) at 90°, cooled and again heated to 90°-100° over a period of three hours till effervescence ceased. The reaction mass was decomposed with ice water and neutralised with ammonium hydroxide on the acidic side. The product obtained was crystallised from hot water and purified (norit) m. p252.°

It is acidic in nature but it does not liberate carbon dioxide with sodium bicarbonate. It gives intense violet colour with ferric chloride giving complex formation. Spectrophotometric study of such a complex formation is under investigation. Equivalent weight determination gives the value 240 as the neutral equivalent and the molecular weight determination by Rast's method gives the value 240. This value corresponds to the molecular weight of 4:5 dihydroxy 2:7dimethyl-p-phenanthroline.

Potentiometric Titration :-

The solution (10 ml; 0.05 M) of the dihydroxy phenanthroline was titrated with N/10 sodium hydroxide solution potentiometrically. it shows two inflections, one at 2.0 ml and the other at 10.0 ml (equivalence point) as shown in fig-1.

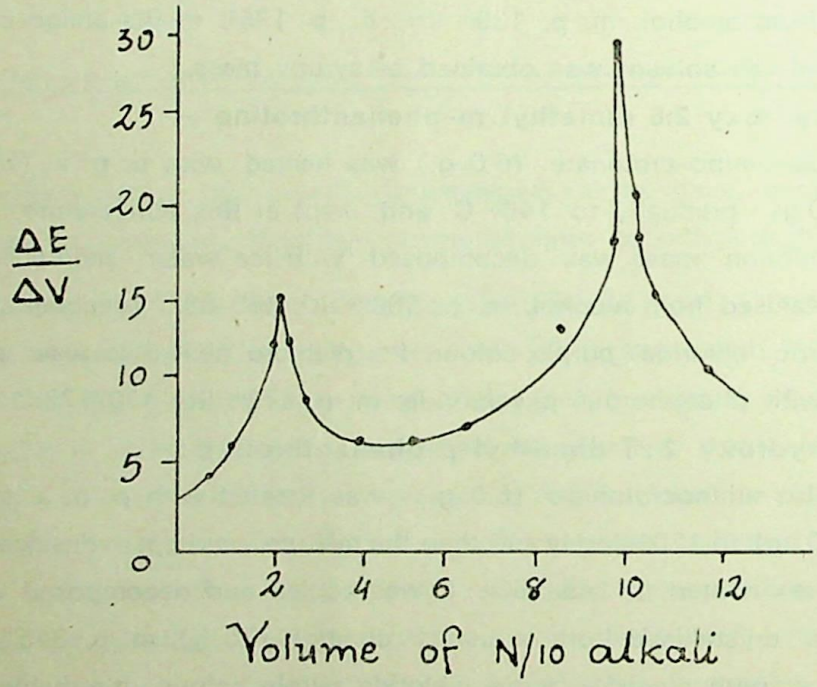


Fig. 1

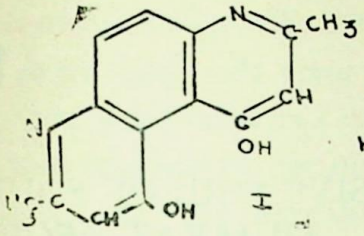
The first inflection is due to the neutralisation of the first hydroxy group. This equivalence also corresponds to the neutral equivalent value 240.

Discussion:-

With rare exceptions, the usual quinoline syntheses applied to 2-naphthylamines and phenylenediamines give benzo (f) quinolines and phenanthrolines respectively.[7] Kermack et. al.[3] have therefore proposed the angular structure for the p-dihydroxy phenanthroline.m.p.345°C.

There is however a possibility that the compound (m. p. 252°) may have the

angular structure I and one melting at 345° the linear diazo-anthracene structure II.



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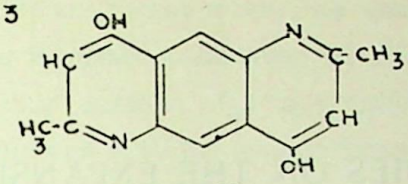

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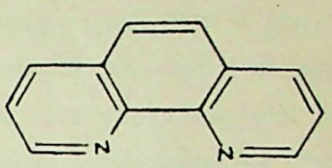

III

It is pertinent to note that 1,10-phenanthroline III has complexing capacity and gives colour reactions with Fe (III) and Fe (II). The deep violet alcoholic soluble complex of this compound with Fe (III) lends support to such a similar angular structure having two hydroxyl groups attached to carbons in place of nitrogen in a similar pattern; while the linear structure (II) is not expected to give deep violet colour with alcoholic ferric chloride. However, this problem is under further investigation.

Acknowledgement :

One of the authors (AGM) is thankful to the college authority for providing research facilities.

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13

STUDIES ON THE EXPANSIVE SOIL OF SOUTH GUJARAT REGION

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Abstract

The paper presents the comprehensive study on the chemical and mineralogical compositions of the parent material–the trap rock and its weathered product–expansive soil in South Gujarat region, The relation between the chemical compositions of the trnp rock and its weathered product has also been discussed in detaiis. The influence of the genetic conditions on the formation of the type of the soil in the region has been highlighted. It has been shown that the chemical and mineralogical compositions of the trap rock have predominent bearing on the physical and engineering characteristics of the weathered product under prevaling genetic conditions. (Key words : Trap rock; genetic conditions, chemical weathering, expansive soil).

Introduction

The nature and behaviour of the expansive soils in general, are highly influenced by pedological conditions under which they are formed. These soils are observed to be derived from different parent materials like trap rocks, gneisses, basalts, volcanic ash, calcarious aluvium and sedimentary rocks with calcarious shale, lime stone, slate and sandstone (Gerassimov 1958, Raychaudhury 1958, Sinha 1957, Tamhane and Namjoshi 1959, Tamhane and Karale 1967). However, trap rocks gave rise to most of the expansive soils in India. The decomposition of these rocks in situ in typical climate results in clayey residue which by long cycles of secondary changes and impregnation of iron and humus acquires the characteristics of expansive soils (Raychaudhury 1958).

Semi arid, hot climate and poor drainage are mainly responsible for the formation of these soils from different parent rocks. The variation of rain fall in the area in which these soils occur is generally between 50 cm to 75 cm, most of which is being precipitated in a short duration of 3 to 4 months in a year. This wet spell is then followed by hot summer with the temperature variation between 5°c to45°c (Gerassimov 1958, Raychaudhury 1958).

The vegetation has vital role in imparting the characteristics to the solls. Gerassimov (1958) observed the influence of the vegetation on the formation of these soils from trap rocks under savannah vegetation and sharply arid hot climate.

Inspite of the genetic conditions controlling the physical and engineering behaviour of the soils, the chemical and mineralogical compositions of parent rocks heve direct influence on the products of decomposition. Tamhane and Namjoshi (1959) reported that the expansive soils derived from different rocks under similar climatic conditions, have composition similar to that of parent rocks.

South Gujarat region is mostly covered with the expansive soil which is generally yielded from the trap rock. This soil has typical physical and engineering characteristics which create Peculiar problems for the structues constructed in the region. The representative soil samples have been collected from four sites namely Broach in North, Bulsar in South, Bardoli in East and Surat in west. The chemical, physical and engineering properties of these samples have been determined. The results obtained are presented in this paper and influence of genetic conditions on the chemical, physical and engineering properties has been discussed in details.

Genetic Conditions in the Region

The parent material for the formation of the expansive soil in the region is the trap rock popularly known as Deccan Trap. It is formed during the late Cretaceous period' when the peninsular region witnessed an unprecedented voluminous lava flow. The trap rocks generally consist of several verieties varying from the most acidic to basic ones. However, the basic variety is most common in the region which accounts for more than 90% of Deccan Trap formations.

The results of chemical and mineralogical analyses of trap roceks in general, have been reported by many research workers (Panda 1972, Pascoe 1964, wadia

1961). The most striking feature of these analyses is unconformity of composition of the majority of trap rocks, with variation in silica from 48.6% to 52%. Eleven samples of the trap rocks, collected from widely scattered localities have been chemically analysed in detail by H. S. Washington. The avarage of this analyses is given in Table 1. This chemical constitution of the trap rocks, expressed in terms of standard normative minerals calculated from the chemical composion, gives the results as shown in Table 2 as the norm of the trap rocks (Wadia 1961).

The climatic condition in the region is shown in Table 3. Long hot season followed by short rainy season with large variation in annual temperature is the climatic characteristic in the region, According to Lang's classification of climates, the region falls in the zone of semi arid climate (Daji 1955).

Entire region is covered with grass, acacia and other trees which prevent land erosion during rainy days.

The region has low topographic relief with gentle slope towards West excluding few hilly areas like Parnera, Rajpipla and Songadh.

Experimental

Chemical composition as well as physical and swelling properties of the samples have been determined by conducting tests on fractions passing through IS Seive 200. pH and C.E.C. values were also obtained. These estimations were done by employing standard and reliable methods.

Loss on ingnition was determined by heating the samples in silica crucible at 900°c temperature in muffle furnace for a period of about an hour (Vogel 1962).

Silica content was estimated by alkali-fusion and HF-H_2SO_4 treatments. Acid extract of fused samples obtained during alkali-fusion was used for the estimation of sesquioxide, iron oxide and titanium oxide. Volumetric analyses for the estimation of total iron content were conducted using internal indicator. However, for the estimation of titanium content which is very low in the samples, Colorimetric method was adopted using Klett-Summerson Photoelectric Colorimeter. The aluminum content was then computed from the values of sesquioxide, iron oxide and titanium oxide contents (Snell 1963, Welcher 1956).

The samples were separately treated with HF–H_2SO_4 mixture and the residue after evaporation was dissolved in dilute HCl for the estimation of calcium, magnesium, sodium and potassium contents. The so called acid extract was analysed by Flame Photometry for the estimation of calcium, sodium and potassium contents using Carl-Zeiss Flame Photometer. Further, Complexometric method was employed to estimate jointly the calcium and magnesium contents (Grove 1937, Snell 1963). pH and C.E.C. values for each of the samples were, obtained by pH meter and Potentiometric Titration respectively (Marshall 1949). Total clay fractions (partical $\leqslant$2 microns) in the samples were obtained by the method of Sedimentation. The results obtained are shown in Table 4.

Physical properties like liquid limit, shrinkage limit, specific gravity and hygroscopic moisture were obtained as per relevent Indian Standard Specifications.

Swelling pressure test at constant volume was conducted on air dried samples, statically compacting them in a Standard Proctor mould to the densities corresponding to maximum dry densities existing in field. The base plate and plunger plate were perforated to allow water required for saturation. The mould was placed in a saturation tank kept below the plunger of the loading device. With the progressing saturation the samples expanded in their axial direction, the expansion being neutralised continuously by the loading wheel. The pressure recorded at the end of complete saturation is the maximum swelling pressure.

Free swell test was conducted on the fractions passing through BS 36 mesh Sieve (equivalent IS Sieve 425 microns). About 10g. of such oven dried soil was gently poured in a graduated cylinder filled with water. The volume of the settled and swollen soil was read after 24 hours and percentage free swell was determined (Holtz and Gibbs 1956). The results of the tests are shown in Table 5.

Discussions

The South Gujarat region has low relief, semi arid and humid climate which favour the process ot decomposition. Two primary elements of climate namely precipitation and temperature supply necessary water and heat to react with the parent rock. In addition, fauna and flora accelerate the process of decomposition by formation of organic acids and salts. As a result, most of the silicate minerals break down into relatively insoluble residues with the liberation of soluble substances which are removed in solution by percolation and leaching.

The parent rock is unsaturated with respect to free silica. However, the silica that is present in the parent material in its molten state is utilised in the formation of orthosilicates and metasilicates like pyroxene group of minerals, olivine and felspars. The amount of augite (pyroxene) is as great as that of felspars. Chemically, augite is Ca0. Mg0. $2Si0_2$ with (Mg, Fe) 0. $(Al, Fe)_2 0_3$. $Si0_2$. When augite and olivine are exposed to the atmospheric condition, silica gets released and iron combines with oxygen forming oxides.

Labradorite, bytownite and andesine are the chief soda–lime felspars (plagioclase) in the trap rock in the region. Under the hydrolysing action of slightly carbonated waters, the felspars break down in the following way forming clay minerals.

$$H_2O + CO_2 + \underset{\text{albite}}{NaAlSi_3O_8} \rightarrow Al_2Si_2O_5(OH)_4 + \text{clay mineral}$$
$$SiO(OH)_2 + \text{silicic acid}$$
$$Na_2CO_3, \text{ removed in solution}$$

$$H_2O + CO_2 + \underset{\text{anorthite}}{CaAl_2Si_2O_8} \rightarrow Al_2Si_2O_5(OH)_4 + \text{clay mineral}$$
$$SiO(OH)_2 + \text{silicic acid}$$
$$Ca(HCO_3) \text{ removed in solution}$$

Silica in weathered product is generally derived by decomposition of rock minerals like quartz, augite and plagioclase. However, the silica content in the samples studied is high which may be due to the free sand falling into the shrinkage cracks formed during the dry weather.

Felspars contribute alumina content. Complete decomposition of felspars contribute 13.5 % alumina. But, the samples from Bulsar, Broach and Bardoli show less alumina and the sample from Surat has alumina content almost same as that in trap rock. The climatic observations at these sites indicate that the relative humidity and difference in maximum and minimum temperature during day and year may be the affecting factors.

Rock minerals contributing iron content are augite and hypersthene. The iron content in the samples studied ranges from 7.4 % to 10.25 %. The discrepancies in the content with compared to that in trap rock may be attributed to leaching and transportation.

Ilmenite is only mineral from which titanium is derived. Comparision of titanium content in parent rock and soil samples reveals the fact that leaching and transportation phenomena are also effective during the process of decomposition of ilmenite.

Calcium, magnesium and sodium contents are derived from rock minerals like anorthite, plagioclase, augite and hypersthene. These contents in soil samples are very low. Thus, the trap rock containing considerable amount of magnesium and sodium weathers in to expanding lattice type clay minerals, resulting from low rain fall, poor drainage and semi arid climate.

The comparision of C. E. C. values of the total sample and clay fractions ($\leqslant$2 microns) clearly indicates that the fractions greater than 2 microns have insignificant contribution to C. E. C. values of total sample. High C. E. C. values of clay fractions may be due to the charge deficiencies in the structural lattice of the clay minerals which impart the characteristics of swelling and shrinkage to the weathered soil. Further, the samples have high values of liquid limit, plastic limit, swelling pressure and free swell as well as low shrinkage limit which are the indirect evidences of the presence of the expanding lattice type clay minerals having great affinity to cations and dipolar liquids.

Thus, the presence of Na, Ca, Mg, Al, Fe etc. in the weathering zone afrer the break down of trap rock due to insignificant leaching caused by semi arid climate, low permeability, poor drainage etc. has been the major factor in the formation of bentonitic and illitic types of clay minerals in the weathered expansive soil in the region.

Conclusions

Low relief, humid climate, low rainfall etc. are the main factors which favour the process of decomposition of the trap rock. As a result, bentonitic and illitic types of clay minerals are the chief residual products of the soda-lime felspars. Leaching and transportation of soluble substances of the decomposed rock minerals are intense in the region. The typical climate as well as chemical and mineralogical compositions of the trap rock impart to the soil the characteristics of shrinkage and swelling.

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Table 1

Avarage Chemical Composition of Trap Rocks

Constituents		Percentage
SiO_2	...	50.61
Al_2O_3	...	13.58
$Fe_2O_3 + FeO$	...	13.11
MgO	...	5.46
CaO	...	9.45
$Na_2O + K_2O$	...	3.12
TiO_2	...	1.91

Table 2

Norm of Trap Rocks (D. N. Wadia)

Rock Minerals		Percentage
Quartz	...	4.18
Orthoclase	...	4.45
Albite	...	22.01
Anorthite	...	23.07
Diopside	...	17.41
Hypersthene	...	17.78
Magnetite	...	4.64
Ilmenite	...	3.65
Apatite	...	1.01

Table 3

Climatic Conditions at the Sites

Sites	Anual avarage rain fall (cm)	Avarage number of rainy days per year	Anual temperature		Avarage relative humidity per year (%)	Lang's classification
			Maximum (^{0}c)	Minimum (^{0}c)		
Broach	92.55	42.90	43.50	4.00	57.00	Semi arid
Bulsar	154.00	62.00	40.00	11.00	63.00	Semi arid
Bardoli	140.00	59.00	43.00	9.00	58.00	Semi arid
Surat	145.00	60.40	42.00	10.00	60.00	Semi arid

Table 4

Avarage Chemical Composition of the Expansive Soil

Constituents	Sites			
	Broach	Bulsar	Bardoli	Surat
Clay fractions	43.50%	34.20%	33.60%	37.00%
pH value	7.00	8.00	6.50	9.00
C. E. C. values : (m/100 g)				
Total sample	42.35	29.98	42.79	37.40
Clay ($\leqslant$2 mocrons)	95.90	92.50	89.78	103.50
Loss on ignition	12.18%	14.62%	12.72%	13.44%
SiO_2	61.06%	62.24%	62.67%	56.75%
Al_2O_3	9.40%	8.11%	8.36%	12.96%
Fe_2O_3	9.56%	7.40%	10.25%	9.89%
TiO_2	0.74%	0 99%	0.81%	0.75%
$SiO_2R_2O_3$	3.25	4.08	3.33	2.48
CaO	2.34%	1.59%	1.34%	2.18%
MgO	1.21%	1.26%	1.20%	1.41%
$N_2O + K_2O$	1.92%	3.21%	1.83%	2.16%

Table 5

Physical and Swelling Properties of the Expansive Soil

Properties	Sites			
	Broach	Bulsar	Bardoli	Surat
Physical Properties :				
Hygroscopic moisture	11.23%	8.06%	10.85%	10.52%
Specfic gravity	2.78	2.74	2.77	2.76
Liquid limit	67.80%	57.78%	70.38%	64.40%
Plastic limit	33.25%	26.80%	33.70%	34.20%
Plasticity index	34.55%	30.98%	36.68%	30.20%
Shrinkage limit	8.72%	9.84%	9.75%	8.40%
Swelling properties :				
Moulding density (t/m^3)	1.52	1.60	1.42	1.45
Swelling pressure (t/m^2)	19.30	18.62	15.62	16.56
Final degree of saturation	98.60%	97.20%	97.86%	95.86%
Free swell	35.00%	28.40%	38.54%	34.70%

DYNAMICS OF CONFLICTS IN ORGANIZATIONS– COMMUNICATIVE ASPECTS

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Introduction :

Conflict is inevitable everywhere. It exists in organizations too, and owing to the organizational complexities no amount of efforts can eliminate it completely. Many of the intricate management problems of an organization are due to the conflicts and/or conflicting situations present therein because conflicts are mostly injurious to, and disfunctional in, achieving organizational goals. Conflicts have a high degree of positive correlation with power and power politics of an organization. Conflicts results in competition for acquisition and exercise of power by means other than the formal power that one has to his credit and the exercise of power results in conflicts. For example, A exerts some force other than the existing forces on B, may be because A wants to bring B's behaviour Vis–a–vis him, vis–a–vis a particular group, or vis–a–vis the organization as a whole in line with the desired behaviour, gives rise to a conflict. Thus, conflict is nothing but, the 'gap' between the existing behaviour of one party and the behaviour which other party expects from this party. The extent and consequences of the conflicts depend on the characteristics of the 'gap' as determined by the nature. basis, and magnitude of the force which one party exerts and the forces which it is attempting to overcome in order to determine the other party's behaviour.

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Most of the conflicts arise because of lack of proper communication through the length and breadth of the organization. The communication that takes place in an organization depends mainly on the formal organization structure, the informal network of interpersonal relationships, the structure of-the power politics, and the resulting conflicts. In this paper we have made an attempt to develop a model which may be useful in the analysis and understanding of the nature of different types of conflicting situations present in an organization or situations that might arise in an organization, which in turn may help the management to resolve and control the conflicts most effectively and efficiently. In the development of the model only those factors have been considered which directly or indirectly determine the communication in an organization.

Communications In Organizations :

The essence of an 'On-Purpose' organization-business, social, or cultural-lies generally in organized human endeavour where a number of persons perform certain specialized task, the product of which is supposed to fit together 'in some timely or logical way, so that the objective of the organization is achieved which would not be achieved if any one of these people tries to perform all the tasks by himself. It means that every speclalized task-function must make certain contribution to the overall objective in some rational way so that the objective of the organization is achieved in some desired fashion.

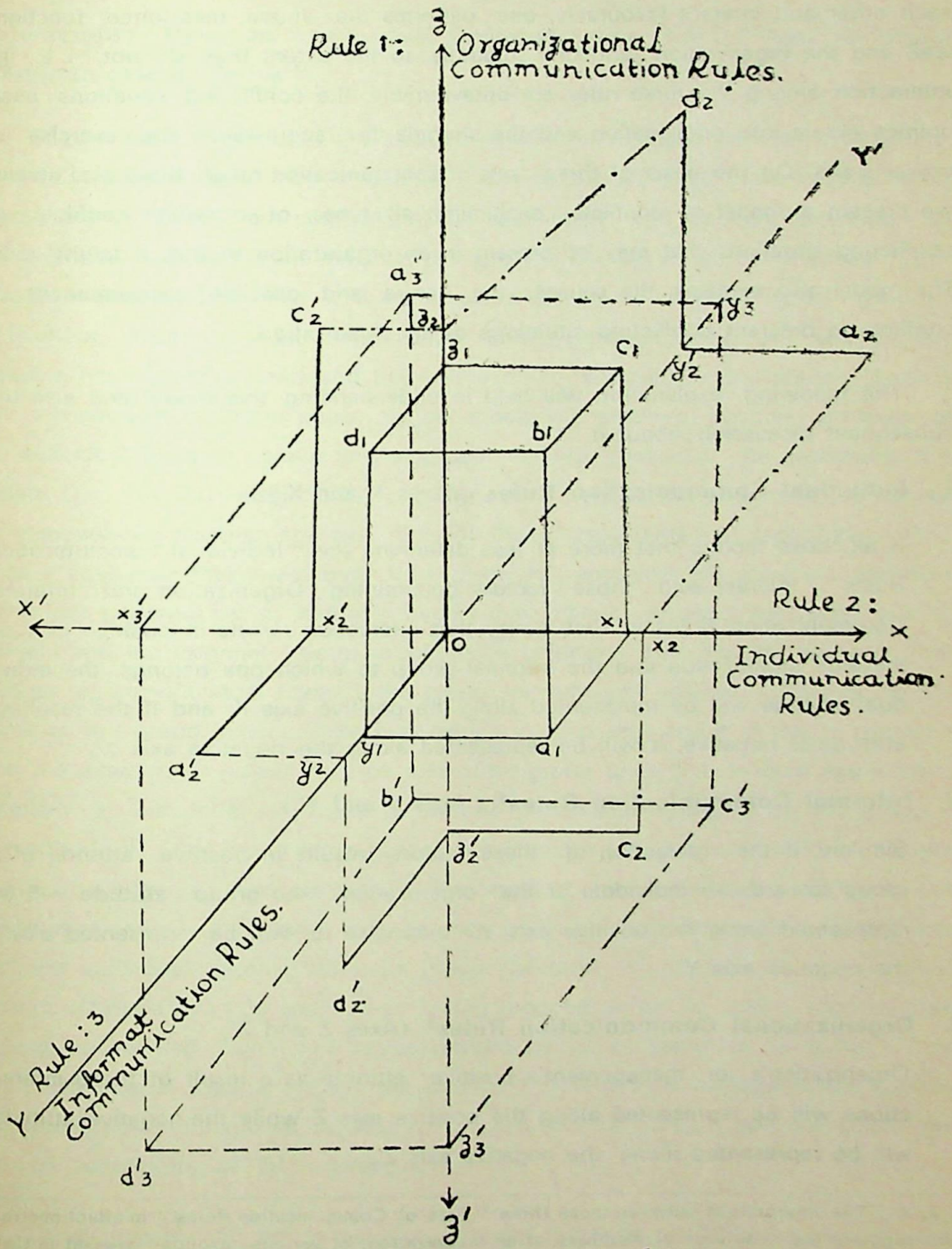
This is made possible by regulating the performance of specialized task-functions by the "rules" of the task-performance imposed by the organization upon the person who performs that particular task-function. These "rules" can be considered as a system of constraints which in effect limit the personal judgements which the person can exercise about the what, the when, the how, and the where of his task or about his performance of that task. The system of constraints depends apart from other factors, like organizational goals, its policies (both, specific and general), procedures (of performing and controlling various activities), methods (of different operations), etc., upon the organizational structure and the resulting communication channel. It is important to note that an organization continues to function as an organization only to the extent that its "System of constraints" is appropriate and adequate to the needs of the organization at some point in time.

Communication system of an organization is composed of people, of "rules of communicating" (as determined by the "System of constraints"), and of the resulting structure. In an organization people communicate with each other and are supposed to follow the "rules of communication" imposed by the organization, but at the same time people bring with them certain "rules of communication" from their larger culture to which they belong. These "rules" depend upon (i) traditions, norms, values, beliefs, etc., of the society to which a person belongs, and also (ii) on his individual status, his own beliefs and habits, his own temperament, the norms of his own professional group, his educational and family background, his nationality, his own superiority and inferiority complexes, etc. Apart from these two sets of "rules of communication" there is a third set of "rules of communication" which depends upon the climate of relationships that develops among employees over a period of time on the basis of personal likes and dislikes, levels of education, place of work, similarity of languages spoken and functions performed, similarity in nationality or regional origin, similarity of religion and caste, similarity of age, sex, or seniority in the organization, and similarity of problems, beliefs, fears and interests. The "rules of communication" imposed by the organization, which are supposed to be followed by any one working for that organization, are effective only to the extent of his inclinations to abide by these "rules provided by the other two rules as discussed above. For the purpose of discussion we will call the first set of rules of communication as "organizational rules", the second set as "individual rules" and rhe third set as "informal rules."

The "organizational rules of communication present the structure of organization's authoritative power, whereas tne "individiual" and "informal" rules of communication, more or less, determine the structure of political power. It is, therefore, not possible to explain the forces which dominate and control the internal organization in terms of traditional managerial concepts of hierarchy and authority but can be explained in terms of organization's authoritative power structure and its political power structure. Organizational authoritatirian power is imposed upon someone because of his position in the organizational hierarchy whereas political power is acquired and exercised through politics which includes those factors by which one's personality is determined.

When working in an organization one has to be impersonal to organization routines and procedures, to conform to group standards and norms, to experss

himself as an individual and to recognize others similarly, to cooperate in rhe achievement of common goal, and to compete in the achievement of personal



Model:- Interaction Patterns And Conflicts.

goal. To the extent the three "rules" of communication are compatible with each other and interact favourably, one performs the above mentioned functions well and the organization functions smoothly; to the extent they do not, i, e., the interaction among the three rules are unfavourable, the conflicting situafions arise, politics enters into organization and the struggle for acquisition and exercise of power starts. On the basis of three "sets of communication rules" discussed above, we present a model of conflicts, explaining all types of possible conflicts, or conflicting situations that may be present in an organization or that it might face. The model also explains, the causes, the nature and possible consequences of conflicts in different conflicting situations of an organization.

The following explanation will help in understanding this model and also the subsequent discussion about it.

1. **Individual Communication Rules**[1] (Axes X and X').

   If all those factors that more or less determine the "Individual communication Rules" interact with those factors determining Organization and Informal Communication Rules in such a way that interaction results in positive attitude towards organization and the informal group to which one belongs, the individual attitude will be represented along the positive axis X, and if the resulting attitude is negative, it will be represented along the negative axis X'.

2. **Informal Communication Rules**[2] (Axes Y and Y')

   Similary, if the interaction of these factors results in positive attitude of a group towards an individual or the organization, the group attitude will be represented along the positive axis Y. otherwise it, will be represented along the negative axis Y'

3. **Organizational Communication Rules**[3] (Axes Z and Z')

   Organization's or management's positive attitude as a result of these interactions will be represented along the positive axis Z while the negative attitude will be represented along the negative axis Z'.

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1. 2. 3. : The interactions between these three "Sets of Communication Rules" in effect control and regulate the behaviour of members of an organization, of various groups present in that organization and of the management of the organization. These interactions more or less determine the communicational output like attitude, expectations, intentions, etc.

The possible interactions have been discussed in the following paragraphs :

Interactions Between "Individual Communication Rules" And "Informal Communication Rules"

Plane XY : It represnts the zone of positive interactions between "Individual Communication Rules" and "Informal Communication Rules". As long as these two "Sets of Rules" are compatible with each other, the resultant behaviour of an individual will lie within the zone XY and the degree to which they are compatible will determine how well an individual is able to maintain good relations with other members of an organization and a group in particular, and thereby satisfies his personal goals and helps the other members to contribute towards the achievement of group goals. In our model the extent of positive attitudes of an individual towards group and of group towards individual will determine the length Ox_1 and Oy_1 respectively, and these two lengths will determine the degree of compatibility between the two "Sets of Rules" represented by length oa_1. One should note here that eventhough the plane XY represents the zone of desirable behaviour patterns, yet a "hidden" conflict may remain present between an individual and the informal group to which he belongs. This may be because, the attitude of an individual towards the group, eventhough positive, may not be the same as the group expects from him, which in turn, may result in the "conflict" and the exercise of power from the side of the group towards individual might start. Similarly, an individual may have to exercise power and influence on the group if the attitude of the group towards him, eventhough positive, may not be the one which he expects from the group. The conflict will have to be hidden in the sense that neither the group will express any resentment with the individual nor will the individual express with the group because of the fear of the present positive attitude towards each other being reduced or turued into a negative one (the plane in such cases will be represented by either plane XY' or plane X'Y as discussed later). The nature of the conflict, so long as it belongs to the pattern of interactions represented by plane XY, will be such that it will not affect the smooth functioning of the organization.

Other possible interaction patterns between "Individual Communication Rules" nd "Informal Communication Rules" may be as follows :

1. **Plane X′Y :** It represents the negative attitude of the individual towards group with the group's positive attitude towards him. Under this situation the conflict may be hidden or open depending upon group's ability to control individual's attitude and accordingly the exercise of power may be latent or open. In our model one such plane, "Ox_2' a_2' y_2", is represented by the negative attitude Ox_2' of the individual and positive attitude Oy_2 of the group.

2. **Plane XY′ :** It represents the positive attitude of the individual towards group with the group's negative attitude towards him. Under this situation also the conflict may be open or hidden depending upon the individual's ability to influence the group and in the absence of this ability it is possible that he finds it difficult to get along well with the group. In our model one such plane. "Ox_2 a_2 y_2'", is represented by positive attitude Ox_2 of the indivudual and negative attitude Oy'_2 of the group.

3. **Plane X′Y′ :** It represents the zone where negative attitude of the individual interacts with the nagative attitude of the group. Under this situation the ensuing conflict will be open and exercise of power and influence will also be direct and open, both ways, i. e., from individual to group and from group to individual. In our model one such plane, "Ox_3' a_3' y_3'," is represented by negative attitude Ox_3' of the individual and negative attitude Oy_3' of the group.

Interactions Between "Individual Communication Rules" And "Organizational Communication Rules"

1. **Plane X Z :** Like plane X Y, the plane X Z represents the zone of positive interactions between "Individual Communication Rules" and "Organizational Communication Rules", i, e., it represents the zone of compatibility of the two sets of rules. The degree of compatibility will represent how well one is able to serve his goals while serving his organization and how well organizational powers, procedures and other conventions affecting the individual help him in serving the organization better and thereby in fulfilling his own needs. In our model one such plane, "Ox_1 c_1 z_1" is represented by positive attitude ox_1 of the individual and positive attitude Oz_1 of the organization. A hidden conflict may still be present within this zone for similar reasons as explained in case of X Y interaction described earlier.

Other possible interaction patterns between "Individual Communication Rules" and "Organizational Communication Rules" may be as follows :

1. Plane X'Z : It represents the zone of interactions between negative attitude of individual and positive attitude of the organization. The resulting conflict may be hidden or open and the exercise of power and influence may either be latent or open depending upon the individual's position in organizational hierarchy and the value of the individual for the organization. One such plane "Ox_2' c'_2 z_2", is represented by negative attitude Ox_2' of the individual and positive attitude Oz_2 of the organization.

2. Plane XZ' : It represents the zone of interactions between positive attitude of the individual and negative attitude of the organization. The resulting conflict may be either hidden or open and exercise of power and influence may be latent or open depending upon individual value to the organization and alternative courses of actions available to him in terms of opportunities elsewhere. As a result of this type of conflict, an individual may have to leave the organization. One such plane, "Ox_2 c_2 z'_2", is represented by the positive attitude Ox_2 of the individual and negative attitude Oz'_2 of the organization.

Plane X'Z' : It represents the zone of interactions between negative attitude of the individual and negative attitude of the organization. The resulting conflict may take the shape of open fight between an individual and the organization, and there may be direct exercise of power from both the sides the extent of which shall be limited by the abilities of the parties concerned. One such plane, "Ox_3' d_3' z'_3", is represented by negative attitude Ox_3' of the individual and negative attitude Oz_3' of the organization.

Interactions Between "Informal Communication Rules" And "Organizational Communication Rules".

Plane YZ : Like planes XY and XZ plane YZ represents the zone of positive interactions between "Individual communication Rules" and "Informal Communication Rules", i.e.. it represents the zone of compatibilities of these two "Sets of Rules". The degree of compatibility will determine as to how well organized groups are present in an organization and how good is the organizational environment for these groups. This zone will represent the areas of cooperation between an organization and its organized informal groups. The conflict, eventhough hidden,

may still be present if there remains some gap in the expectations of the two parties concerned from each other. One such plane, "Oy_1 d_1 z_1" in our model is represented by the positive attitude Oy_1 of the group and positive attitide Oz_1 of the organization, in our model.

Other possible interaction patterns between "Informal Communication Rules", and "Organizational Communication rules", may be as follows :

1. Plane Y'Z : It represents the zone of interaction between negative attitude of the group and positive attitude of the organization. The ensuing conflict may be hidden or open depending upon the capability of the organization to control group activities, and accordingly the exercise of power and influence may be latent or open. In our model, one such plane, "Oy_2' d_2 z_2", is represented by negative attitude Oy_2' of the group and positive attitude Oz_2 of the organization.

2. Plane YZ' : It represents the zone of interactions between positive attitude of the group and negative attitude of the organization. The enusing conflict may be hidden or open depending upon group's ability to put pressure on the organization. One such plane, "Oy_2 d_2 'z $'_2$ ", is represented by the positive attitude Oy_2 of the group and negative attitude Oz_2' of the organization.

3. Plane Y'Z' : It represents the zone of interactions between negative attitude of the group and the negative attitude, of the organization. The resulting attitude is bound to be open and the exercise of power and influence from both, group towards organization and organization towards group, is usually direct and open. Most of the Union–Management conflicts lie in this pattern of interactions. One such plane in our model, "Oy_3' c'_3 z'_3", is represented by negative attitudes Oy_3' of the group and Oz_3' of the organization.

Interactions Between The Three "Sets Of Communication Rules".

Interactions between the "Three Sets of Communication Rules" are represented by a three dimensional figure, i. e., they represent a space, just as interaction between two sets of Communication Rules" have been represented by planes in our model. Following spaces of interaction patterns are possible :

1. **Space XYZ** : This represents the zone of positive interactions between the "Three Sets of Communication Rules". As long as these "Rules" are compatible, the resultant behaviour pattern of an individual in relation to the organization

and to the group, will lie within this zone XYZ and the degree to which they are compatible will determine as to how well an individual is able to serve his group, his organization and his own needs. The degree of compatibilities will be determined by opportunities of need satisfaction that are available to an individual from his group and his organizaiion. It will also be determined by those organizational conventions that help in building the healthy informal structure which, in turn, may help the organization in fulfilling its objectives. A hidden conflict may still be present within this zone of positive interactions because of the "gap" between the existing behaviour towards each other and expected behaviour from each other. The nature of the conflict will be such that it will not affect organization's smooth functioning and exercise of power will be mostly through indirect or latent or positive means. One such space in our model is represented by positive attitude Ox_1 of the individual, positive attitude Oy_1, of the group and positive attitude Oz_1 of the organization. The other patterns of interactions may be represented by the following spaces :

2. **X′ YZ; XY′Z;** and **XYZ′ :** These spaces represent the zone of interactions of one negative attitude with the remaining two positive attitudes. Being three dimensional figures it is difficult to represent these spaces in our model. The nature of the conflict within these spaces may be hidden or open depending upon the power structure of the organization. The extent of the power to be exercised by the other two parties with positive attitudes to overcome the negative attitude of the third party will depend upon those factors that determine the real powers of the three parties.

3. X′Y′Z; X Y′ Z′, X′ Y Z′ : These spaces represent the zone of interactions of the negative attitudes of the two parties with the positive attitude of the third party. These spaces also have not been shown in our model because of the difficulties of representing so many three-dimensional figures at a time. The nature of the conflict within these spaces may be hidden or open depending upon the power structure of the organization, and the extent of power to be exercised will depend upon those factors that determine the power of the three parties.

Space X′ Y′ Z′ : This represents the zone of negative interactions between the three "Sets of Rules." One such space is shown in our model by the negative attitude Oz_3' of the individual, negative attituce Oy_3' of the group, and negative

attitude of Oz_3' of the organization. The resulting conflict will have to be open. Thls type of situation will result in open conflict and under the circumstances, there are bound to be heated exechanges, open fights between the individual, group and the organization. Under such conflicting situations, it will be difficult for individual to remain in the organization or it will be impossible for the organization to manage its people or it may be even difficult for organization to exist.

Other pattarns af conflicts may be conflicts between two individuals, or between two groups or between two organizations, but the nature of the conflict will essentially be measured by the interactions between the three "Sets of Rules" as discussed above.

From the above discussion we conclude that the state and nature of conflicts in an organization is, more or less, detrmined by the interaction-patterns among the three "Sets of Rules" of communication. It will, therefore, be more advantageous to think in terms of finding some correlation between the state and nature of conflicts, the bases and nature of power at the command of individuals, groups, and organization, and the interactions among the three "Sets of Rules." This will enable us to make the communicational analysis of the conflicting situation related with power and conflict in an organization and with this, one may be able to manage and control the "conflicts" or conflicting situations by simple communicational means.

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A SURVEY OF HAEMATOPHAGOUS ARTHROPODS IN SURAT DISTRICT, GUJARAT– A GENERAL ACCOUNT[1].

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1 Part of this paper was presented in IIIrd Annual Conference of P. S. M. at New Delhi in Jan. 1973.

Haematophagous arthropods provide vectors of human and animal diseases. The incidence and distribution of these vectors, subject to the biotic and abiotic factors, determine the incidence and prevalence of vector borne diseases. The biotic community contributing to the disease phenomenon in nature remains local in distribution. Rao et al (1973) have stated that information regarding the distribution of different groups of blood sucking arthropods except mosquitoes in India is scanty. This field study was undertaken during May' 72 to Nov' 73 in Surat District of Gujarat.

Survey Area :

The survey areas of Surat District include urban area (Surat city) semiurban area (Ambanagar, & Umraonagar) and rural area (Kavtha, Kukarmunda, Selud and Siletvet), are located in the southern tip of Satpuda range. The average rainfall in survey area is 35 to 40 inches. The soil is alluvial type in urban and semiurban areas while black-laterite soil in rural area. In urban area, houses are constructed of bricks and cement. In semiurban and rural areas the huts are of two types, one in which the walls are made of clay and cowdung, while in second type it is made of bamboo plastered with clay and cowdung. The roof is generally covered by toddy leaves. Cattles. buffaloes, oxen, dogs, goats and pigs are

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common animals of these areas. In semiurban and rural areas sanitation is poor and water is available only from the nearest well.

Method :

Collection of free living haematophagous arthropods i.e. mosquitoes and sand-flies were made in and around the habitation and in likely resting/ breeding places. The larvae/pupae of mosquitoes were reared to adult in the laboratory at Surat.

Small mammals were trapped by wonder traps and ectoparasites were isolated. Domestic animals were also examined for ectoparasites in this study area, It was ensured that the all domesticated animals examined were local and not introduced into the areas recently.

Results :

In table 1 & 2 all the species of arthropods so far recognized in Surat District have been listed. The tables do not give any idea of the abundance of any species, a subject which will be dealt separately in detail, but only of its confirmed occurrence in the district.

Altogether, 2202 haematophagous arthropods were collected from 7 villages of Surat District. The present paper offers information on the occurrence of 13 species of Culicidae, 5 species of Phlebotomine, 1 species of Pupipara, 4 species of Siphonaptera, 7 species of Ixodoidea, 7 species of Anoplura and 4 species of Mesostigmatid mites.

Besides these, 41 small mammals viz. Mus sp. indet. 1; Rattus rattus, 35: R. norvegicus, 2; Suncus murinus, 1; and Tatera Indica 2 were captured. The overall trap positivity rate was 48.9%; and 2.28 small mammals per positive trap were captured.

The paper presents the information only on the occurrence and distribution of each species in Surat District of Gujarat, State.

Acknowledgement :

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TABLE No. 1

Shows the prevalence of free living haematophagous arthropods of Surat District.

Sr. No.	Species.	Urban.	Semi urban.			Rural		
		Surat city	Ambanagar	Umraonagar.	Kavtha.	Kukarmunda	Selud.	Siletvet
1	2	3	4	5	6	7	8	9
1.	Anopheles annularis.	—	—	—	—	—	—	+
2.	Anopheles culicifacies.	+	+	+	+	—	—	+
3.	Anopheles fluviatilis.	—	—	—	—	—	—	+
4.	Anopheles pulcherrimus	—	—	—	+	—	—	—
5.	Anopheles stephensi.	+	+	+	+	—	—	—
6.	Anopheles subpictus.	+	+	+	+	—	—	—
7.	Anopheles vagus.	+	+	+	+	+	—	+
8.	Culex fatigans.	+	+	+	+	+	+	+
9.	Culex gelidus.	—	+	—	—	—	+	—
10.	Culex vishnui.	—	+	+	—	—	—	—
11.	Aedes (Stegomyia) aegypti.	+	—	+	—	—	—	—
12.	Aedes (Stegomyia) vittatus*	+	—	—	—	—	+	—
13.	Armargeries obturbans	+	+	+	—	—	—	—
14.	Phlebotomus argentipes.	—	+	+	—	+	—	—
15.	phebotomus papatasi.	+	+	+	+	+	+	+
16.	Phlebotomus minutus	—	+	+	+	—	—	—
17.	Phlebotomus montanus.	+	+	+	+	—	—	—
18.	P. (Sergentomyia) punjabensis.	+	+	—	—	—	+	—

* This species described for the first time on the basis of material collected during the present survey.

+ = Detected; – = Not Detected.

Table No. 2

Shows the distribution and prevalence of ecto-parasites of domestic/small mammals of Surat District

Sr. No.	Species.	Urban	Semi urban.		Rural			Hosts.	
		Surat city	Amba-nagar.	Umrao-nagar.	Kavtha	Kukar-munda	Selud.	Sile-tvet.	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
	Pupipara :-								
1.	Hippobosca longipennis.	—	—	—	--	—	+	—	Dog.
	Siphonaptera :								
2	Xenopsylla cheopis.	+	+	—	+	—	—	—	Rattus rattus
3	Xenopsylla astia	—	+	—	—	—	—	—	Tatera indica
4.	Ctenocephalides canis.	—	+	+	—	—	—	—	Dog.
5.	Ctenocephalides felis.	—	+	+	—	—	+	+	Buffalo, Cow Goat
	Ixodoidea :-								
6.	Haemaphysalis bispinosa	—	+	+	—	—	+	+	Buffalo Dog.
7.	Hyalomma a. antolicum.	—	+	+	—	—	+	+	Buffalo
8.	Hyalomma brevipunctata	—	—	—	—	—	+	+	Buffalo
9.	Hyalomma marginatum isaaci.	—	—	—	—	—	—	—	Buffalo
10.	Rhipicephalus sp. indet.	—	—	—	+	+	+	—	Buffalo
11.	Rhipicephalus sanguinous.	—	+	—	+	+	+	+	Buffalo, Dog Rattus rattus.
12.	Argas persicus.	—	—	—	—	—	+	—	Fowl nesting.
	Anoplura :-								
13.	Haematopinus tuberculatus	+	+	+	—	—	—	—	Buffalo.
14.	Hoplopleura oenomydis	—	+	—	—	—	—	—	R. rattus R. norvegicus.
15.	Polyplax spinulosa	+	—	—	—	—	—	—	R. rattus.
16.	Polyplax stephensi.	+	+	—	—	—	—	—	R. rattus. T. indica

Table No. 2 Continued.

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
17.	Pediculus humanus.	—	+	+	+	+	+	+	Man.
18.	Linognathus stenopsis	—	+	—	—	—	—	—	Goat
19.	Trichodctus canis.	—	+	—	—	—	—	—	Dog.
	Mesostigmatid Mites :								
20.	Haemolaelaps glasgowi	—	—	—	+	—	—	—	Rattus rattus
21.	Laelaps nuttali.	+	—	—	+	—	—	—	Rattus rattus
22.	Laelaps sp. indet.	—	—	—	+	—	—	—	Rattus rattus
23.	Ornithonyscus bicoti.	+	+	—	+	—	—	—	Rattus rattus

+ = Detected — = Not Detected.

16

THE COMPOSITIGN AND REVENUE ESTIMATES OF SURAT ATHTHAVISI PARAGANAS ACCORDING TO DIFFERENT AUTHORITIES OF THE EIGHTEENTH CENTURY

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Since the times of the Mughals, Surat Sarkar consisted of Surat city together with the castle and the twentyeight paraganas called Surat Aththavisi. Traditionally these twentyeight paraganas constituted the territory of the Surat Sarkar. However when the government of the Aththavisi changed and new annexations took place due to conquests the territorial boundaries of the Aththavisi also changed and revenue realisations of these paraganas also underwent sizable changes. The purpose of this article is to throw light on the composition of these Surat Aththavisi paraganas at different periods of the eighteenth century and their revenue estimates during these periods. The principal authorities which supply information about this period are : the Persian source Mirat-i-Ahmedi, and the English sources, mainly Aitchison's Collection of Treaties, Engagement, etc. (Vol. IV) and G. V. Forrest's Selections (Home-series). One important source of information about revenue of the Aththavisi is the exchange or correspondance between the Company's officers posted in Surat and Bombay as regards the Aththavisi's Revenue possibilities during the times of the First Maratha war. This correspondance is preserved in the Bombay Records Office. For example in 1781, Rawson Hart Bodam, an officer at Surat sent the figures of revenue actually realised in the Aththavisi and therefore they are highly trustworthy. The figures given by Mirat-i-Ahmedi refer to the years roughly 1700-10, and those by Aitchison are taken from the partition-deed between Peshwa and Gaikwad and refer to the year 1751. However they are only estimates. But all these authorities give very reliable information regarding the compositon and revenue estimates of the paraganas over the stretch of the century, viz, the 18th century. Let us now examine comparatively the details given by these authorities and form our own conclusions.

A comparative statement of the composition of Surat Aththavisi paraganas and tneir Revenue Estimates according to different authorities of the 18th Century.

Nos	1	2	3	4	5	6	7	8	9
	Names of paraganas accoding to Mirat-i-Ahmedi(1) (1700–1710)	Names of Gaikwad paraganas according to partition deed (2) of the Peshwa and Gaikwad. (1751-52) (28th March) (1752)	Names of paraganas according to W. Andrew price (3) (1772) (27th April-1772)	Names of paraganas according to Rawson Hart Badam (4)(1781)	Revenue Estimates according to Mirat–i–Ahmedi(1) (1700–10)	Revenue Estimates of tne Gaikwad paraganas according to partition deed (2)(1751–52)	Revenue Estimates according to W.Andrew Price (3) (1773)	Revenue Estimates according to Rawson Hart Bodam (4) (1779)	Remarks and modern names
								Rs. As. P.	
1.	Chorasi	Chowrasee	Chorassy	Chowrasy	1,04,190	1,37,500	2,20,000	82,500:3:67	Choryasi
2.	Kamrej	Kamrej	Comrez	Cambrage	48,380	44,000	1,04,000	41,250:0:0	Kamrej
3.	Taleswar	Tarkeshvur	Targasseer	Tarkesseer	87,020	6,500	10,000	1,559:0:0	Tadkeswar
4.	Mahuva	Mahe	Mowah	Mowah	18,760	41,000	70,500	36,666:0:0	Mahuva
5.	Gandevi	Ghundevee	Gandevee	Gandeve & Bellemorah	57,500	65,000	99,000	78,325:3:50	Gandevi
6.	Anaval	Anas (?)	Unnoval	Anaval	2,250	3,000	9,500	6,231:2:0	Anaval
7.	Biadra	Vihare	Verran and Surranram	—	29,910	11,000	46,000	—	Vyara
8.	Luhari	—	Boaney	Bohari	2,500	—	10,500	5,042:2:33	Buhari

1. Mirat-i-Ahmedi P. 180 Gaikwad's Oriental Series No. XLIII Vide Appendix III of "Surat under the Britishers."
2. C. U. Aitchison : A Collection of Treaties, Engagements etc Vol. IV. Appendix P. III to VI, Vide Appendix IX of 'Surat under the Britishers'
3. Letter from William A. Price to the President of 27th April 1772 vide Appendix XVI of 'Surat under the Britishers.'
4. C. W. Forrest : Selections-Home Series PP. 439-40 Vide Appendix XXVII of 'Surat under the Britishers.'

Nos	1	2	3	4	5	6	7	8	9
9.	Malur	—	Waliaw	Valode	9,870	—	94,000	8,800:0:0	Valod
10.	Sosah	—	Supah	Soopah	41,000	—	1,29,500	46,081:0:0	Supa
11.	Valsad	—	Versaul	Bulsaur	89,430	—	1,15,500	73,791:2:67	Valsad
12.	Talary	Tekundee	Tillarey	Tellady	12,400	72,500	1,49,500	85,353:3:0	Teladi
13.	Navsari	Nowsaree	Nowsary	Nowsary	15,080	17,000	32,000	13,450:3:67	Navsari
14.	Barnoli &	—	Bondaly	Bardolly)		—	5,300	4,675:0:0	Mirat-i-Ahmedi gives a
15.	Mola	Mota	Molah	Moutah) Kasba)	12,500	10,000	14,000	3,363:1:0	consolidated figure for Bardoli and Mota.
16.	Sarbhon	—	Surboan	Surbon	30,620	—	56,500	49,500:0:00	Sarbhon
17.	Chikhlee	Chikhlee	Chikhled	Chickly	40,000	67,000	1,24,000	96,250:3:67	Chikhli
18.	Kherod	Kurod	Cundoe	Carode	17,300	30,500	74,000	12,833:1:34	Kadod
19.	Rander	Raner	—	—	6,620	10.000	—	—	Rander
20.	Amroli	—	—	—	38,500	—	—	—	Amroli
21.	Malwea	—	—	—	4,960	—	—	—	Not identified
22.	Kos	—	—	Cass	3,010	—	—	6,968:2:0	Kos
23.	Marasar	—	—	—	16,750	—	—	—)	Not identified
24.	Hanosar	—	—	—	2,500	—	—	—)	,,
25.	Ghadakah	—	—	—	3,200	—	—	—)	,,
26.	Saharat	—	—	—	4,000	—	—	—)	,,
27.	Baniah	—	—	—	38,600	—	—	—)	,,
28.	Barjul	—	—	—	1,34,430	—	—	—)	,,

Nos	1	2	3	4	5	6	7	8	9
29.	Vahmuri	—	—	—	1,875	—	--	—	) ,,
30.	—	Bisunpur	Wassavpore	Wassanpore	—	12,000	35,000	6,783:1,33	Visalpar
31.	—	—	Ulpar	Oulpar	—	—	4,50,000	229,167:2:34	Orpad
32.	—	Vusraee	Bussaroyah	Vissaravey	—	64,000	1,65,600	33,917:2:33	Vasaravi
33.	—	Gunti	Gullah	Gullow	—	59,000	1,07 500	30,250:0:0	Ghallan
34.	—	Temba	Teema	Tembah	—	40,500	90,000	18,333:1:33	Timba
35.	—	—	Untopore	Antapore	—	—	28,000	16,041:2:67	Antapore
36.	—	—	Parchol	Parchore	—	—	54,000	1,15,500:3:67	Panchol
37.	—	—	Parnella	Parneira	—	—	38,000	22,916:2:67	Parnera
38.	—	Balesar	Ballasseer	Balliseer	—	85,000	2,07,000	82,500:0:0	Balesar
39.	—	Murolee	Monrolly	Marolly	—	42,500	73,500	56.714:1:50	Maroli
40.	—	—	Settergoon	Sattergoom	—	—	99,000	79,750:0:0	Sattargam
41.	—	Veripar	Barroan	Virriow casbah	—	25,000	25,000	14,924:1:0	Variav
42.	—	—	Hassote	—	—	—	1,57,000	—	Hansot
43.	—	—	Kirkan	—	—	—	1,10,000	—	Not identified
44.	—	—	Punchmoaley	—	—	—	30,000	—	Punchouly
45.	—	—	—	Bhootsar	—	—	—	8,250:0:0	Bhutsar
46.	—	—	—	Arjunghur	—	—	—	56,977:1:87	Arjungadh
47.	—	—	—	Neira	—	—	—	9,372:3:0	Navera
48.	—	—	—	Nagarhavelly	—	—	—	5,415:3:59	Nagar Haveli
49.	—	—	—	Omargaun	—	—	—	20,926:3:42	Umargam
50.	—	—	—	Chhipagaut	—	—	—	1,650:0:0	Chhipaghat
51.	—	—	—	Bhattahgaun	—	—	—	22,000:3:67	Bhattagam
				Total :	12,38,465*	—	23,17,400	14,72,116:1:24	

* In the above total the Revenue of the City and the Mint (Rs. 2,79,000) is included.

The above Statement shows :

(i) At least eight paraganas in the list of Mirat-i-Ahmedi have not been identified. Possibly the villages indicating the names of paraganas mentioned therein might have disappeared with the passing of time.

(ii) The composition of the Aththvisi paraganas attached to Surat, and broadly demarcated between the rivers Kim and Par had not remained uniform throughout the 18th century; but its boundary had shifted in the north upto Hansote in 1773 while in 1780 the Umergaon area and Nagar Haveli territorry of the Portuguese were taken over by the British, thus stretching its boundaries to South beyond the river Par, Within the old Aththavisi itsself, new paraganas were created by the Marathas. (Viz. Nos. 30 to 41, which are not included in the list of Mirat-i-Ahmedi) Thus the number of original twentyeight paragana went on increasing according to the exigencies of circumstances o r rhe expansionist policy of the new political power.

(iii) The Vyara paragana in the East is not mentioned in the list of Rawson Hart Bodam (1780), nor is there a mention of the revenue collected from that area by the Englisn. According to the treaty of Kundhela, the English were not entitled to occupy that place and collect its revenue since Fatesing had kept Vyara and Songad for himself according to that treaty.

As regards the revenue eastimates of the Aththavisi paraganas the following points should be borne in mind before arrivlng at any conclusion.

(i) The revenue figures taken from the partition-deed of the Peshwa and the Gaikwad (1750-51) pertain only to the Gaikwadi paraganas. The corresponding figures of the Peshwa's paraganas are not available. Hence total figure for that period is not computed.

(ii) The figures given by Rawson Hart Bodam (1781) are actual figures, while those of Mirat-i-Ahmedi (1700-10) and William Price (1773) are only rough estimates.

Bearing the above in mind, it emerges from the accompanying tables that the total revenue of the Aththavisi which was estimated at about Rs. 12.36 lakhs in 1700-10, rose as high as Rs. 23.17 lakhs in 1773, but came down to 14,72 lakhs in 1780. Even if we assume that the figure of William Price (1773) might be slightly

inflated, it seems certain that the revenue ot Aththavisi paraganas increascd considerably from the figure of 1700-10. This fact is more amply borne out by the consistent rise in the revenue of most of the individual paraganas during the period 1751 and 1773.

The figures of 1780 show a clear fall to Rs. 14.72 lakhs though the southern paraganas stretching from Bhutsar to Umargaon yielding a revenue income of about one lakh were conquered and annexed by the British. In case of all the individual paraganas except. Parchol and Orpad, the fall in the revenue was remarkeble after the British conquest in 1779. It seems that the revenue income, which had nearly doubled to Rs. 23.17 iakhs in the year 1773, came down roughly to Rs. 14.72 lakhs in 1780- a figure very close to that of 1700–10. (Viz. Rs. 12.36). The fall in the revenue income aiter 1773 was clearly due to the onslaught of British expansionism in the Aththavisi paraganas and the ravages of the first Maratha War, (1775–1780).

A Comparative Study of DHRUVASWAMINI DEVI By K.M. MUNSHI AND DHRUVASWAMINI By JAYSHANKAR PRASAD

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The purpose of this paper is to present a comparative study of the two plays having the same theme and some of the same leading characters taken from the golden age of ancient India. "Dhruvaswamini" written by Jayshankar Prasad and "Dhruvaswamini Devi" written by K. M. Munshi show marked difference in their respective approach to and presentation of the theme. The purpose of the former is to present it as a problem play in the background of history, whereas the latter's aim is to give a realistic picture of Gupta dynasty and the love episode therein. Both of them have tried to enliven the past which was forgotten and which no historian, even in the time of the Guptas, found it worth recording The playwrights' endeavour is to bring to life the history's most interesting and dramatic event which was purposefully not brought to light by the historians, perhaps, with a view to presenting Chandragupta's glory as absolutely unstained. What else could be the purpose of deliberate elimination of the description of life and death of Ramgupta who ruled for the brief interim between Samudragupta and Chandragupta II ? A new chapter has been added to Gupta dynasty since the recovery of Vishakhdatta's "Devichandraguptam", a play found in a truncated form, unfolding the shrouded history of Ramgupta, the eldest son of Samudragupta. Sylvian Levi[1] discovered this fact and now it is accepted by almost all historians that Chandragupta II did not ascend the throne immediately after the death of Samudragupta. If Ramgupta had ruled for a longer period he would have brought

the glory of the Guptas to the dust very soon as he was quite unfit to manage the affairs of the state and was a cowardly and unscrupulous ruler.

Besides the fragmentary play "Devichandraguptam" there are other sources also which throw light on this lost chapter. Some ancient inscriptions on copper plates, "Harshcharita" and "Muzmul-Ul-Twarikh" by Abulhasan Ali[2] are important sources which provide the authors with useful information that Vishakhdatta's work does not give.

"Dhruvaswamini" by Prasad has three acts, whereas "Dhruvaswamini Devi" by Munshi has four acts. Prasad's first act begins where Munshi's first act ends. In other words the content of Act II and Act III of Munshi's "Dhruvaswamini Devi" makes up Prasad's whole play consisting of three acts. Munshi has not cared for the unities, whereas Prasad has scrupulously followed all the three. In Munshi's play the action is spread over a period of more than one year and its location ranges from Kusumpur to Ujjaini. Thus, there can be no unities of time and place, but the arrangement of the events paves the way to the desired goal of the author, viz., a love story complete in itself, woven against the historical background and ending in marriage. In Prasad's play the first act opens at the time of sunset. We can guess that it must be 6 O' clock in the evening and the third act is over approximately by 10 O' clock next morning. Only in sixteen hours the whole thing is over. The camps of the two antagonists are not very far from each other, and the entire action takes place practically at the same place. On the other hand K.M. Munshi has to deal with intervals of longer periods between the acts as the places are very far from each other. The distance between Patliputra in the first act and Ujjaini in the second is about four hundred miles. Ramgupta's death occurs in the third act in both the plays. However, Munshi does not end the play with the death of Ramgupta as Prasad does. It was not possible for him to do this because he had before him certain aims as explained below.

When Chandragupta kills Ramgupta in the third act, it looks as if he is mentally deranged, though actually he is not. At this juncture if he presents himself in his original form, he will be considered a selfish opportunist who is lying in wait to grab the throne and get married to his brother's wife. Actually when he kills Ramgupta, he does it in self-defence. If he had not attacked Ramgupta, Guhsen and others would have killed him on the spot. The murder

does not seem to be intentional. On the contrary, he is incited to do it. In a way both the playwrights have tried to keep Chandragupta's image untarnished by not involving him directly in the commitment of the murder. Prasad shows that Ramgupta meets his end at the hands of Samant Kumar who attempts to save Chandragupta. Instead of ending the play here, Munshi had to contrive yet another act to send Chandragupta temporarily away from Kusumpur. For prolonging the action, it is announced at the end of the third act that Ujjaini is attacked again by the Sakas. Chandragupta, inspite of feigned madness, rushes to Ujjaini and when he returns after four to five months he presents himself as a man cured of his temporary madness. So the fourth act looks like an extension which makes the structure loose. This does not happen in Prasad's play as he does not extend the play to show the marriage of Chandragupta and Dhruvaswamini. The end of the wicked ruler in a most dramatic situation makes the reader believe that the inevitable will follow—Chandragupta's succession to the throne and his marriage with Dhruvaswamini, the two facts which no historian has ever denied. But Munshi has spared no pains in developing the theme of love between the two which covers practically more than two-thirds of the fourth act including Kalidas's recitation of "Kumar Sambhavam" serving as the last straw on the camel's back. When this continues inside the palace, the people of Kusumpur rise in revolt against Dhruvaswamini. The angry mob rushes towards the palace and breaks open the doors of the royal chamber. Some critics[3] have described this scene as an admixture of two conflicts—internal and external, which, although acceptable to a certain extent, fails to sustain interest. The interminable conversation between the lovers works as a drag on the action and mars the beauty of the play. The reader waits to witness some physical action and full-blooded dialogues which may lead to a moving and exciting finish to this drama, but even after Chandragupta's encounter with the furious mob nothing happens except expression of surprise visible on the faces of Skund, Vatsya and Daman followed by a speech from Chandragupta telling them how he got victory at Ujjaini and how he got married with Dhruvaswamini. Without any resistance from the mob the drama ends in a tableau, and all is over.

In utter disregard of history Munshi simply devises the development of love theme and its intensity in the hearts of Chandragupta and Dhruvaswamini to justify their union in the last act.

Contrary to this, the last act of "Dhruvaswamini" by Prasad, closes abruptly, but not without reaching the climax the playwright wanted to achieve. Bereft of all possession and power, Ramgupta becomes delirious. He finds in his brother the root cause of his own downfall. He cannot bear the cruel reversal of fortune so sudden and so uubelievable and hence with the last cowardly attempt he moves towards Chandragupta, takes out his dagger and tries to stab him, but his plan is thwarted by Samant Kumar's gallant effort. The dramatic action is very effectively backed by equally powerful dialogues that lift the play to a great height. As no source can indicate clearly how Ramgupta was killed, we cannot accuse Prasad of twisting or changing the historical fact.

The inscription found on one of the ancient copper plates of Amoghvarsha mentions that one Gupta king killed his brother and grabbed his kingdom and got married to his wife. Some historians believe that this refers to Chandragupta II.[4] In the fifth act of Vishakhdatta's "Devichandraguptam", Chandragupta is seen pretending madness, but it can never be known whether he kills Ramgupta as the final portion of "Devichandraguptam" is lost. We assume that his madness is the outcome of some fear in his heart. Ramgnpta must have discovered the fact of Chandragupta's romance with Dhruvaswamini and must have planned to kill him. And so, in the last resort, Chandragupta under the pretence of madness must have killed his brother. Munshi follows the above quoted sources scrupulously and makes the version as truthful as possible, and as a result he lengthens the play and consequently it is structurally loose and dragging at the end.

Samudragupta, the Napoleon of India as described by Vincent Smith[5], had conquered most of the parts of ancient India. He had wished Chandragupta, his second son, to become his successor to the throne of Patliputra, but somehow Ramgupta came to the throne after Samudragupta's death. Chandragupta sacrificed his own right in favour of his elder brother. Ramgupta was no better than the Roman emperor Nero, always in the company of women and soaked in wine a great irresponsible idiot, a crude and cowardly ruler and a disgrace to the Gupta dynasty. He showed an utter contempt for the greatness of his father and sneered at religion, religious people and all the high values of life.

The first act of "Dhruvaswamini Devi" opens with romantic conversation and bold expression of love between young Kalidas and his beloved Madhvi. It is in

marked contrast to the opening of Jayshankar Prasad's play. Therein Dhruvaswamini is shown as a solitary and grief-striken figure, whose condition is no better than that of a captive. It is an irony of fate that Dhruvaswamini has the misfortune to marry Ramgupta who never loves her and who as regards his character is in complete contrast to her. He is rather blind to her great virtues and suspects her to be unfaithful to him. Her plight is expressed by Kalidas in one of his similies in Munshi's play. He describes her to Madhvi :

કેવી ભવ્ય અને કરુણ મૂર્તિ જાણે ઉગતા પ્રભાતે
ભૂલી પડેલી ફીક્કી આછી શશીલેખા

This simile speaks volumes of Dhruvaswamini's pitiable condition in the first act.

Chandragupta comes from Ujjaini after two years. He wants Ramgupta to accompany him to Ujjaini to boost the morale of his army fighting against Mahakshtrap Rudrasen of Surashtra. Chandragupta insists on Ramgupta's presence at Ujjaini, but Ramgupta refuses bluntly with several insulting remarks against his father and against religion. In his refusal he reveals his nonchalance towards his duty and his wantonness. But Dhruvaswamini, to everybody's surprise, shows her willingness to go to Ujjaini.

The first act also shows that Chandragupta had been to Champawati, the birth-place of Dhruvaswamini. Munshi has taken this fact, perhaps, from Abulhassan's "Muzmul-Ul-Twarikh." There it is mentioned that before she got married to Ramgupta, her betrothal was fixed with Chandragupta. Munshi does not take the whole fact, whereas Prasad follows it in full. In Prasad's play Chandragupta speaks to himself in the last act :

मैं पुरुष हूँ ? नहीं। मैं अपनी आँखो से अपना वैभव
और अधिकार दूसरों को अन्याय से छीनते देख रहा हूँ और
मेरी बागदत्ता पत्नी मेरे ही अनुत्साह से आज मेरी नहीं रही।

He again asks furiously to Amatya :

मेरी बागदत्ता पत्नी और पिता द्वारा दिये हुअे
मेरे सिंहासन का अपहरण किस के संकेत से हुआ ?

This clearly shows that she was betrothed to Chandragupta. How she got married to Ramgupta is nowhere to be found.

The place of the battle in Munshi's play is Ujjaini. In Prasad's play the name of the battlefield is not mentioned, nor is it possible to know how far it is from the capital.

In the second act of "Dhruvaswamini Devi", the imperial palace of the Guptas is surrounded by Mahakshtrap Rudrasen's army. Chandragupta's army suffers a very great defeat at the hands of the Sakas and brings disgrace to Undan and other commanders. Never had they experienced such shameful defeat. It had happened due to Ramgupta's inept fighting. He miscalculated the enemy's move, rushed like a fool at the wrong moment and finally fled from the battlefield with his army.

Rudrasen, the victor, demands heavy compensation which the Guptas are unable to give. They request him to reconsider his demand. Rudrasen wants to avenge his father's defeat. He mocks everybody and threatens to kill them unless they are prepared to satisfy his wants. Amidst this strife Dhruvaswamini appears on the scene. Rudrasen becomes so spellbound by her bewitching beauty that he is prepared to waive his demands if she is given to him. Everybody is shocked at this audacity. In the midst of all tension and agony Ramgupta remains unpurturbed. He is prepared to save his skin by accepting Rudrasen's demand. He says :

તમે બધા ભલે તૈયાર હો. હું નથી. મારે જીવવું છે.
ભલે ધ્રુવદેવી સુરાષ્ટ્ર શોભાવે.

The entire scene is the work of Munshi's superb craftsmanship and high imagination. This is the most dramatic scene in the play. There is no such attempt in Prasad's play. This scene gives vent to Chandragupta's intense feelings for Dhruvaswamini. In Prasad's play Dhruvaswamini is only informed that she will have to go to Shakraj. In Munshi's version she comes face to face with Rudrasen and so the change in his behaviour seems credible. In Prasad's play Shakraj's demand is for a different reason. He is not bewitched by her beauty, but he claims her because according to him she was to be given to him in marriage but later was given to Samudragupta as a gift.

The only weak point in this scene is Dhruvaswamini's passivity. She does not speak much, nor does she revolt against Rudrasen's infamous demand and its ready acceptance by Ramgupta.

In Prasad's play, on hearing about this shameful condition, she is iufuriated. She defies boldly the simultaneous attacks of Ramgupta as well as Shikhar Swami. She says to Ramgupta :

तुम मेरी रक्षा नहीं कर सकते, अपने कुलकी मर्यादा,
नारी का गौरव नहीं बचा सकते—तो मुझे बेच बी नहीं सकते हो ।

and to Shikhar Swami :

उपाय नहीं तो न हो—निर्लज अमात्य—फिर ऐसा
प्रस्ताव मैं सूनना नहीं चाहती ।

and after the Amatya's exit she falls to Ramgupta's feet in her last endeavour to move him from his mean purpose. She entreats him :

मेरी रक्षा करो । आज मैं शरणकी प्रार्थिनी हूँ ।
मैं स्वीकार करती हूँ मैं तुम्हारी हो कर रहूंगी
मेरा अहंकार चूर्ण हो गया है ।

But all is in vain. Ramgupta does not move. She resolves to commit suicide. No sooner does she take out her dagger than Chandragupta enters to save her. She cannot tolerate this disgraceful and pitiable condition in which she has to stand before Chandragupta. She bursts out :

मैं प्रार्थना करती हूं कि तुम यहाँ से चले जाओ ।
मुझे अपने अपमान में निर्वसन--नग्न देखने का
किसी पुरुष को अधिकार नहीं । मुझे मृत्यु की
चादर से अपने को ढंक लेने दो ।

All credit to Jayshankar Prasad for this wonderful portrayal of a woman's agony and internal struggle so vividly expressed. Dhruvaswamini of Prasad is decidedly a superior character to that of Munshi's. The deep-rooted agony in a helpless woman, so very nicely portrayed, has a power to move even the most superflcial reader. Her character in Prasad's play once again comes up in the final stage of the last act where she spits fire and defies her opponents despite the danger she faces. The language she speaks is the language of wounded pride. She justifies her title role and remains a matchless character in the whole play.

Dhruvaswamini is a different character in the final phase of Munshi's play. Hers is the mood of resignation. She does not want to live. She wants to bring

down the curtain on the tragic history of her unhappy life. There is no pomp, no power, no force, no passion, only a mood of destitution of a helpless lover who has lost ground.

Chandragupta decides to go to Rudrasen's camp in the guise of a woman and is accompanied by some twenty soldiers. He goes to the camp of the enemy, kills Rudrasen and routs his army. Dhruvadevi eagerly awaits his arrival but they are not destined to be united. Under the orders of Ramgupta, Guhsen enters her chamber and kidnaps her to Kusumpur.

In Prasad's play the scene is altogether different. The duel between Chandragupta and Shakraj is actually shown and that too in the presence of Dhruvadevi. Ramgupta sends Dhruvadevi also to Sakraj's camp as he wanted to get rid of both. The coward never thought that fortune favours the brave. After the enemy army is routed, Ramgupta immediately comes to Sakraj's camp with a view to killing Vikramaditya and Dhruvaswamini, but all Samants declare him unfit for the throne and the Purohit declares that, sinner as he is, he has no right to be the lord of Dhruvaswamini. In his attempt to kill Chandragupta he himself is slain.

After Sakraj's death Munshi does not bring about Ramgupta's end so suddenly, because he has taken as his source the episode of Chandragupta's madness described in the fifth act of "Devichandraguptam"[7] and so Munshi's third act opens in Kusumpur with Chandragupta appearing as a mad man. He feigns madness to save himself from Ramgupta's evil designs and also to meet his beloved Dhruvaswamini. He talks of Samudragupta's horses and their mysterious neighing. The senseless words may be related to his fears regarding the downfall of the glorious empire which was handed down to them by his father Parakramdeva Samudragupta. Samudragupta's great achievements and glory will dwindle to nothing, he thinks.

Ramgupta and Guhsen find Chandragupta and Dhruvadevi talking with each other in seclusion. Ramgupta orders Guhsen to kill Chandragupta, but in the fight that ensues Ramgupta is strangled to death by Chandragupta,

The seed of revolt is sown immediately after Ramgupta's death. Vatsya's cunning eyes, his reluctance in accepting Dhruvaswamini as the successor, and his suggestion to install Skund in Ramgupta's place, show the signs of the coming storm. As soon as Vatsya suggests Skund's name, the news comes from Ujjaini

that fresh trouble has broken out there. Chandragupta goes to Ujjaini to rescue it from Sakpati's attack.

The people of Kusumpur rise in revolt under the leadership of Vatsya, Skund and Daman. This is because they consider Dhruvaswamini responsible for Ramgupta's death and Chandragupta's madness.

For nearly twenty eight days Dhruvaswamini fights with the help of Harisen. While the people are storming the gates of the palace, Chandragupta unexpectedly returns and saves the situation.

Before the mob rushes in, Yajnavalkya unites Chandragupta and Dhruvadevi in wedlock. On seeing Vikramaditya in the room all stand aghast. The mood of the people is changed and on hearing the story of the conquest of Ujjaini, the shouts of fury turn into the shouts of victory.

When taken separately, both versions of a historical Theme can be considered works of literary genius in their respective languages. Both have certain outstanding features which enable them to secure a permanent place in the history of Indian literature.

The comparative study of both the plays has shown that Munshi is more exact and particular about certain very important points. He introduces his characters so carefully that we do not get confused as to what relation a character has with the past and the present of the story. He has studied the history of the Gupta period and has given detailed description of the customs, the dress, the habits of the people of those days wherever necessary. Far smooth and effective performance of the play he has taken the utmost care to give necessary instructions regarding facial expression, physical action, the names of the places, the exact time of the events and the setting. Even the age of the characters is mentioned. He shows himself a master of stagecraft, a painter who portrays many of his scenes with utmost exactness.

Jayshankar Prasad has taken very little care in observing these points, and he has also failed to develop the love episode as effectively as Munshi does. Munshi is far superior to him in portraying historical characters and he is at his best in creating Ramgupta.

So far as Dhruvaswamini is concerned, Munshi has not portyayed her character

as realistically as he has portrayed other heroines of his famous works. Inspite of her stature and attractive enigmatic personality she does not create an impression of being an outstanding character in the play. His other female characters Madhvi and Sashilekha are also far inferior to Prasad's Mandakini and Koma. The very brief but powerful entry of Rudrasen presents him as a braggart, a victor in ecstasy over his temporary success, and a barbarian. Prasad could not portray Shakraj so very well.

Chandragupta and Ramgupta are poles apart and this very contrast is helpful in bringing Dhruvaswamini closer to Chandragupta. These two main characters find greater scope for their development in Munshi's play. The inclusion of minor characters like Kalidas, Yajnavalkaya and Harisen on the one hand and Undan and Rohal on the other gives us an inkling into the great and glorious age of the Guptas. The galaxy of these great personalities in Kusumpur indicates that this capital of the Guptas was once a seat of learning and literature, art and philosophy, a superb blending of religion, culture and gallantry.

Jayshankar Prasad does not think it necessary to portray such supernumeraries as are engaged for odd jobs and are not helpful in carrying out his purpose of social criticism or commentary on our failings and frailties.

Munshi is all intent on producing effective drama and faithfully evoking the spirit of the age. His play is a much greater work precisely because in it he has concentrated on the inner being of his characters. Jayshanker Prasad has presented it as a historical problem-play-the problem of a woman who is tied to an unscrupulous man against her will. From the very beginning there is no understanding, no love between them. Ramgupta does not believe in ties of marriage. He says :

मैंने ऐसी कोई प्रतिज्ञा न की होगी ।
मैं तो उस दिन द्राक्षासवमें डुबकी लगा रहा था ।
पुरोहितोंने न जाने क्या क्या पढा दिया होगा ।

The man who does not accept any religious bond in marriage wants to assert his right as a husband. Is it ever possible for a woman like Dhruvaswamini to live with such a villain ? If not, what is the solution to the problem ? The only solution is divorce. After considering the whole affair the Purohit releases Dhruvaswamini from the tie of marriage.

The other problem is also universal. If a king is weak or tyrannous, it is the duty of the people and their representatives to replace him by a good one. Ramgupta proves himself absolutely unfit and useless. He makes mockery of religion instead of protecting it He slaughters innocent Sakas including old Mihir-deva and miserable Koma and commits unpardonable sins. He must be replaced by all means. All the Samants ask him to abandon the throne in favour of Chandragupta. To the first problem the solution is lawful separation; to the second, change of power.

History does not say anything about divorce or dethronement, but according to Jayshsnkar Prasad simply killing of Ramgupta and Chandragupta's marriage with Dhruvaswamini would not be enough for the purposes of the play. Murdered he is, but before the killing takes place such a king is divested of his throne because of his evil ways and deeds. Dhruvaswamini marries Chandragupta not because Ramgupta is dead, but she is officially released from the ties of marriage. In other words, to Jayshankar Prasad Dhruvaswamini's divorce is more important than her marriage with Chandragupta and in the same way, Ramgupta's dethrone-ment is more significant than his death.

CONCLUSION :

From the comparative study of the two versions of the same dramatic theme we come to the conclusion that Jayshankar Prasad has tried to make his "Dhruvaswamini" a historical problem play and has succeeded in his effort. His main intention is not a successful presentation of the play on the stage, but a successful representation of two universal problems with the convincing portrayal of main characters. He has taken utmost care to make his play very forceful and compact so as to remain faithful to his theme in general and to its title character in particular. So far as female characters are concerned he stands head and shoulders above Munshi. The only really convincing portrait from Munshi's pen is Ramgupta. Munshi has only one thing in his mind, glory of the golden age of the Guptas adorned by grand personalities like Chandragupta, Kalidas and Yajnavalkya. He not only wants to portray them with all enthusiasm but also likes to see them in flesh and blood on the modern stage and hence has endeavoured to be very exact in giving hints regarding acting and staging and therein he is far superior to Prasad. In brief, Munshi's "Dhruvaswamini Devi" is very good theatre, whereas Jayshankar Prasad's "Dhruvaswamini" is powerful drama.

NOTES

1. Vishakhadatta's fragmentary drama "Devichandraguptam" was recovered by Sylvian Levi, a French orientalist and a Sanskrit scholar who travelled India in early twenties. He discussed this problem in "Journal Asiatic" of Oct-Dec-1923. See "Prasad Ke Natako Ka Shashtriya Adhyayan" by Dr. Jagannath Prasad Sharma.
2. Abulhassan Ali was an Arab who translated an Indian book in Arabic viz., "Muzmul-Ul-Twarikh" which is considered one of the importnnt sources that throws light on the lost chapter of Gupta dynasty.
3. Ratilal S. Naik and Somabhai V. Patel, the authors of "Munshi—Abhyas : Jeevan ane Sahitya".
4. P. 136 of "Prasad Ke Itihasik Natak" by Dr. Jagdishchandra Joshi.
5. Vincent Smith has described Samudragupta as "the Indian Napoleon". See "Munshi : His Art and Work" Commemoration vol. III. Ch. 8.
6. P. 137 of "Prasad Ke Itihasik Natak" by Dr. Jagdishchandra Joshi.
7. See "Prasad Ke Itihasik Natak" by Dr. Jagdishchendra Joshi.

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18

GROUND WATER POLLUTION DUE TO LANDFILLING IN SURAT–A CASE STUDY

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Introduction :

The principal method currently used in our country for disposal of solid wastes generated by communities and industries is open dumping in land–fills. Whether the disposal site is an open dump or a well–maintained landfill, both types of site are the source of pollution. Rainwater and surface runoff water percolate through the landfills, and the resulting leachate has a high concentration of organic wastes and harmful salts, which is many times stronger than would be permitted by ground or surface water standards. This paper discusses the general aspects of ground–water pollution due to solid wastes and also discusses the results of the case study of Gopitalao landfill site at Surat.

Contamination Of Ground Water Due To Solid Waste :

An evaluation of principal sources of ground–water contamination and control methods for protecting further degradation of ground–water quality has been carried out throughout the world. But the problems relatcd to ground–water pollution due to the water leaching of solid waste landfills, are just beginning to be recognised. Municipal and Industrial landfills of solid waste is one of the principal sources of ground–water quality degradation caused by man's activities.

Presently, most of the Indian Municipalities are observed to dump the city refuse in low laying areas. At such low levels the dumped material often comes in contact with the ground-water and pollutes it. Practically no information has previously been developed, however, concerning the nature of the organic pollutants

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entering the ground water as a result of leaching of the solid waste, leaving a major gap in the knowledge needed to evaluate the actual extent of the hazard entailed in such pollution. The incidence of ground water contamination by sanitary landfill can be expected to increase with the more wide spread use of this method for solid waste disposal.

Factors Affecting The Leachate Characteristics :

The generation and movement of contaminants in a sanitary landfill is dependent upon the content, spatial distribution and the time variation of the moisture within that landfill. Other variables which are considered to be important factors affect the quality of leachates includes (i) Hydrological conditions of the areas, (ii) Geological aspects of the area such as different soil types above aud below the refuse cells as well as different types of underground formations present. (iii) Topography of the area (iv) Type and size of refuse (v) Age of refuse cell and (vi) contact hours.

The amount and type of pollution introduced will naturally vary dpending upon the characteristics of the refuse. The types of refuse deposited in the cells exerte a considerable effect on B. O. D.'s and C. O. D.'s produced in leachates since the deposited refuse represents the raw material for this production.

Types of Pollution :

When the soil mantle of the earth is looked upon as the infilterative surface from which ground-water derives, It is evident that the necessary concentration of solid wastes in landfills creates a local pocket of potential infection overlying ground water. Practically no information has previously been developed, however, concerning the nature of the pollutants entering the ground-water as a result of the leaching of the soliedwaste, leaving a major gap in the knowledge needed to evalute the actual extent of the hazard entailed in such pollution.

The pollution introduced by the city refuse can be physical, chemical and biological. The physical pollution introduced into such water can be in terms of turbidity and colour introduced by the waste. In the case of waste mass undergoing anaerobic decompasition, H_2S adds to the tastes and odour. The major pollution introdnced by the city refuse is chemical in nature and the extent of pollution increases as the size of refuse particles is reduced. This has been noticed in. U. K.

where refuse is commonly pulverised before tipping[2]. Carbon dioxide produced during the aerobic reaction combines with water to form H_2CO_3 and dissolve calcium, magnesium and Iron from surrounding strata. These wastes are also observed to contribute a large amount of hardness, BOD and Chlorides.

Laboratory And Field Studies :

Studies have been carried out in India as well as abroad to know the nature and the amount of impurities introduced into the ground-water, due to the present practice of dumpiug of the solid wastes in low laying areas below or near the ground water table. Results of some recent well-documented cases of the ground-water pallution from solid waste disposal in U. S. A. and India are discussed below. Many field and laboratory studies in U. S. A. [2, 3], show that the leachate sometimes possesses a B. O. D. strength of over 30,000 mg. per liter, and strengths of 1000 to 10,000 mg per liter are common. The leaehates also includes high concentration of solids, chlorides, sulphates, hardness, various types of chemicals over and above gases like CO_2, H_2S and CH_4.

One laboratory study carried out in U. S. A. with the help of Lysimeter which simulates the behaviour of the vertical centre of sanitary landfill located above the water table[3] the leachate characteristics of which were studied for about 18 months. Composition of the refuse studied mainly includes paper (44%) Garbage. (10%), leaves & grass (7%), glass & ash (8%) and the rest included plastics, rags, wood, metals, dirts etc. The observations made of the leachate characteristics are given in Table-1.

TABLE - 1

Leachate Characteristics

Compound	Peak value	Average value
pH	9.5	Acidic
Fe	1600 mg / lit	600-1200 mg/lit.
Total solids	2,500 ,,	1000-2000 ,,
COD	50,000 ,,	20000-22000 ,,
Cu	9.9 ,,	0.5-1.5 ,,
Chloride	2000 ,,	100-200 ,,
Na	7700 ,,	700-1500 ,,
Hardness	5300 ,,	700-2500 ,,
Sulhhate	450 ,,	150-250 ,,
Phosphate	120 ,,	5- 25 ,,
Gases	Methane & Carbon dioxide.	

Results of the another field study carried out in U. S. A.[4] to know ground-water quality near a landfill site, are given below, in Table-2.

TABLE-2

Ground water quality near landfill.

Parameter	Ambient (mg/1)	Landfill (mg/1)	Monitor well * (mg/1)
Total Dissolved solids.	636	6717	1506
pH	7.2	6.7	7.3
COD	20	1863	71
Total Hardness	570	4960	820
Sodium	30	806	316
Chlorides	18	1710	248

Field studies carried out by N.E.E.R.I.[5] on leaching refuse dumps of Dharavi & Deonar Creeks near Bombay shows that the leaching liquid exerted high B.O.D. varying from 200 to 4000 mg. per liter.

Ground Water Pollution in Surat :

Surat is having population more than 5 lakhs and area of about 30 sq. km. Surat Municipal Corporation collects the solid wastes generated by the community and disposes it off by the method of open dumps. The major disposal site being the Gopitalao which is 15 years old and is likely to serve many more years. At present, the average quantity of refuse collected in the city is 0.35 kg/capita/day. Landfills in this region are receiving a wide variety of materials including food wastes, paper products, leaves, plastics, textiles, glass metals and street sweepings.

Field study was carried out in and around the landfill to determine whether the presence of the landfill had degraded the quality of the groundwater near the site. To accomplish this task, a short program of chemical and physical sampling of well water surrounding the landfill site was carried out. One sample from the fill itself was also taken.

The results of the analysis of the samples from three wells surrounding Gopitalao and one sample from the fill itself are tabulated in the table-3. The

* Monitoring well located downstream @ 50 m from the landfill, at a depth of about 4 main sanday clayey silt.

sampling was done in August, 1975 and the result is average of two samples collected from each sampling point at the interval of 15 days.

TABLE - 3

Analysis of water from wells located in and near by Gopitalao site.

Parameters	Well No. 1* (mg/1)	Well No. 2** (mg/1)	Well No. 3*** (mg/1)	Landfill (mg/1)
pH	7.0	7.5	7.0	6.5
Hardness	220	455	550	448
Alkalinity	290	920	654	400
Chlorides	172	957	395	192
Total solids	194	2100	1950	4260
C. O. D.	26	32	20	216
B. O. D.	19	28	12	600
Calcium	15	22	21	25

Results of rhe samples of water taken from wells surrounding the landfill site and from the site itself shows that the well water (No. 2 & 3) is having more hardness and chloride content that required by the drinking water standards and to some extent the water is contaminated bacteriologially. While in case of sample taken from the landfill area, the B. O. D., hardness and solids are more which indicates the pollution effect due to solid wastes.

Remedial Measures :

To prevent water pollution, no surface or rainwater should be permitted to percolate through the refuse into the ground-water aquifer. Methods of achieving this goal are experienced in U. S. A. [1, 4, 6], which are not expensive but are yet rarely utilized. Some improvements in the present practice of landfilling and the new techniques are listed below.

(i) Provide sloping of the surface of a landfill which can maximize runoff and minimize infilteration.

(ii) Lining of new landfills with materials of low permeability in combination with leachate collection system. Generally clay, bentonite, polyvenyl chloride sheets, asphaltic and bituminous materials are being used as a lining material. It was

* Well No. 1 located upstream, approximately 87m away from the present landfill site.
** Well No. 2 located downstream, approximately 83m away from the present landfill site.
*** Well No. 3 located downstream, approximately 22m away from the old landfill site.

also observed that the cheaper and more effective liner may be obtained by compacting a layer of clayey soil. The natural soil has an additional advantage that it acts as a natural biological filters to remove bacteria and other contaminations from leachate.

(iii) Care should be taken while compacting and placing cover material over filed refuse material so that no cracks due to settlment should take place.

CONCLUSION :

The results of the quality of well water tested surrounding the Gopitalao landfill site in Surat, shows that the water is contaminated physically, chemically, and biologically. Various field and laboratory studies carried out in India and abroad also show that landfill are the source of ground-water pollution and hence research on tnis vital aspects of ground water quality protection is badly needed.

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19

DEVIATIONS IN ADVERTISING LANGUAGE*

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Advertising language, in which creativity is of the utmost importance, gives the copywriter almost unlimited scope for violations of the rules and conventions of language. Just as the poet takes liberties with the language in order to enrich his expression, the copywriter widens and deepens the potentialities of the language in several ways. "The task of modern creativity in advertising is to find fresh, interest-provoking ways of conveying meaningful information realistically and on the reader's own terms".[1] The limitations imposed by the subject matter are, of course, very great and inescapable but the ingenious copywriter surmounts the likelihood of creating monotonous copies with the creative use of the tool, i.e. by employing linguistic unorthodoxies which not only expand his linguistic possibilities almost infinitely, but help achieve the first aim of an advertisement–to catch the attention of the reader. The goal of an advertisement is, to some extent, achived if the reader is able identify himself or his urges with the advertisement of a product. An advertisement has not only to create a favourable impression, but it has also to incite curiosity, build conviction, create understanding, and develop the urge to investigate for oneself. And all this, in the words of S. I. Hayakawa[2] can only be done by the "poeticizing of consumer goods." If adverti-

* Adapted from Chapter II of the author's doctoral Thesis entitled. 'A Study of the English Language used in Indian Press Advertising'. prepared under the supervision of Prof. H. C. Trivedi, Department of English, South Gujarat University.

sement is not merely to be read, but absorbed by the reader, it has to startle and engage him and, to this end, the copywriter employs linguistic deviations for foregrounding effects. Levin remarks that one way to explain the foregrounding effect produced by syntactic and semantic deviation is to say that the implicit recourse to the grammar of the language that one normally has for understanding a text does not, in the case of deviant sequences, immediately automatically provide an interpretation; one is thus thrown back on the text.''[3]

An attempt will be made here to systematically classify and analyze the deviations of advertising language. The following table[4] will indicate clearly the levels of linguistic description attempted here :

<table>
<tr><th>Phonetics</th><th colspan="2">Linguistics</th><th>Semantics</th></tr>
<tr><td rowspan="2">Phonological Deviations</td><td>Grammar</td><td>Lexis</td><td>Context</td></tr>
<tr><td rowspan="3">Graphological Deviations</td><td rowspan="3">Disjunctive Grammar</td><td>Functional Coversion</td><td rowspan="3">Vagueness of Reference</td></tr>
<tr><td rowspan="2"></td><td>Neologism</td></tr>
<tr><td>Anomalous Lexical Collocation</td></tr>
<tr><td colspan="4">Ambiguity</td></tr>
</table>

Phonological Deviation

Advertising language does not give much scope for phonological deviations. Among 350 samples collected, of advertisements of various products, only Lakme Mascara had an advertisement in which the pronunciation of a word was other than the accepted pronunciation. In two advertisements of the same product, one in **Femina** and the other in **Filmfare**, the advertiser has violated both spelling and pronunciation with a definite purpose. In one, the product promises **Eye-manci.**

pation for the today girl, where the accepted pronunciation of the initial phoneme /i/ has been changed to the diphthong /ai/ . Here the deviant spelling and pronunciation can be justified by the advertiser's aim to highlight the target of his product—the eye. The headline of the other advertisement says: **Lakme starts the Eye-volution.** Here again the initial phoneme of the last word was obviously /i/ but the context would better support the object 'revolution' in which case not only is the vowel changed from /e/ to /ai/ but the initial consonant has been dropped.

Graphological Deviation

Graphological violations are much more frequent in advertising language than in any other register. Both in the brand name and in the text of the advertisement the copywriter can make almost unlimited use of spelling change with the pronunciation remaining unchanged. Here again the idea is to draw attention to a product by giving it a striking brand name or endowing it with qualities which sound like known and accepted words, but which, at the same time, seem distinguishingly original. Sometimes the copywriter exploits the phonological similarity between the name of his product and an accepted word as in the Bonds Shirt advertisement with the Signature line **Gentlemen prefer Bonds** on the phonological analogy of 'Gentlemen prefer Blondes'. It cannot be denied that the copywriter has succeeded in making a memorable slogan. Another shirt advertisement, of Calico's Cali-ber shirts, has the headline **Cali-ber introduces a Cali-doscopic revolution in men's wear.** The change in the spelling of 'kaleidoscope' here has made no difference to its pronunciation while the copywriter has succeeded in introducing a part of the name of the product into the new adjective. Zodiac Ties are meant **For the man with the highest Tie. Q.** Here is a unique case of a deviation where the graphological violation ('tie' instead of 'I') resulted in a phonological change also: / tai/ instead of/ai/. Here, however, the ingenious copywriter, continuing the sound of the last phoneme, /t/, of 'highest' into the initial phoneme. of 'tie', has exploited the phonological similarity between 'I', and '–ie',/ai/. Another interesting graphological feature is that the punctuation mark following the original 'I' (short form of Intelligence) has been retained after 'tie'. In **Eve-innings start best in Piramal Prints** the changed spelling of 'evenings' allows the advertiser to bring in the suggestion of feminine conquest in Piramal prints. Limca (soft drinks)

advertisements have many instances of graphological violations; 'tangi' for 'tangy' 'cloudi' for 'cloudy' 'veri' for 'very' and healthi' for 'healthy'.

Brand names often echo the phonological features of accepted words but have original spellings in order to make a distinguishing departure; and this usually helps to keep the focus on an outstanding characteristic of the product. **Bru** Instant Coffee is one such example. Calico's **Cali-ber** Shirts while retaining part of the original brand name, 'Calico', aiso suggests that the 'calibre' is very high. In the case of **Khira Kommander** desk and chair, the change in the spelling of 'Commander' seems to have no other purpose but to make the initial consonant graphologically similar to that of the name of the manufacturers. An interesting contrast is the brand name **Cadbury's Krisp.** where the initial consonant of 'crisp', phonologically and graphologically similar to that of the manufacturer's name, has been changed only for the sake of originality in spelling. The brand name, **Mini-Hilite,** with several graphological violations also declares in the body copy that **you can turn her on hi or lo. Hypnotique Talc** obviously exploits the name of a very desirable quality in a powder, to which promise women readers are very likely to succumb. The signature line of an Air India advertisement has **Fourward March for Fare Reductions.** where the spelling of 'forward' has been changed to direct attention to the four kinds of reductions in fares, mentioned in the body copy, **Watch everyone making 'you' turns.** Says an advertisement of Thackersey fabrics.

The use of small letters where capitals are normally used is another orthographic device used by many advertisers today and it has become so wide a fashion that it can no longer be considerd a deviation. Another, less frequently employed device, is to write English words, either brand names or the whole text of the advertisement, in Roman script in such a way as to make it resemble the Devnagari script or Arabic script or the script, of a Dravidian language, whichever is relevant to the context. This gimmick also serves to attract the immediate attention of the reader.

Grammatical Deviation

"Grammatical deviance," says Enkvist, "involves tinkering with the normal system of rules. This tinkering can be explained in terms of rule omission or suspension, rule change, or rule addition."[6] Modern advertising makes very liberal

use of disjunctive grammar, in which minor and non-finite clauses are independent. Sentences very often do not have finite predicators, and usually consist of only nominal or adverbial groups, which may consist of only one word. Geoffrey Leech says that "Disjunctive language is primarily associated with headlines, subheads and signature lines."[6] However, the body copy of almost all advertisements today employ disjunctive grammar in preference to the discursive grammar of connected discourse. A headline has to catch the attention of the casual reader in a few words and is therefore the part of the advertisement most apt for the use of disjunctive language. What is true of the advertisement as a whole is even more true of the headline, that it must be immediately comprehensible and directly moving. But "at the same time it must possess all the succinctness of epigram."[7] A headline, therefore, highlights the essence of its message and leaves items of low information value unexpressed. A few examples of headlines with disjunctive grammar are given below :

Twelve ravishing themes—all from Cutex
For the new dew look—Nivea vanishing creme with eucerite
His viewpoint ? Naturally Kapitan
Pretty at a distance prettier in close-up in Shreenivas Florina saris
The complete name in fashion shoes-Bata Walkmaster
Erasmic—the silk-edge blade
Tender on skins—ruthless on beards
At last ! A modern scientific treatment for burns (Shield Antiseptic Cream)

In subheads disjunctive grammar is much more infrequently employed. Sometimes subheads carry on in disjunctive language, the message of the headline. Halo Egg Shampoo's headline 'Put beautiful body and bounce in your hair' is continued in the subhead : **With super conditioning protein-rich Halo Egg Shampoo.** Similarly, 'Cream in the loved look' is followed by the subhead, **With the precious beauty oils in Lakme Cold Cream.** In both these subheads the promise of the headline is made to seem within reach of the reader with the mention of the agent, introduced by the preposition 'with'. A Bata shoes advertisement has a subhead which adds two attractive qualities to the fashion shoes mentioned in the headline : **All bluntly modern within easy reach;** again **The rich, satisfying coffee taste** expands the 'taste' of another headline.

In the bodycopy of today's advertisements disjunctive language has a prominent role to play. Almost all kinds of advertising, but textiles and cosmetics in particular, make use of it in the main text of their messages. An Ambica fabrics advertisement which claims in the headline to have 'patterned the executive look'. says in the body copy : **Dashing Demanding, Dominating. In decision-making stripes,** thus highlighting all the attractive qualities of the fabric in nominal groups, with adjectives meant to appeal to the male reader. The body copy of a Century fabrics advertisement has nominal groups which describe the kinds of fabrics they manufacture : **trendy prints—snazzy weaves—mod pick-me-ups,** while three short nominal groups in the body copy of an advertisement for Anne French Hair Remover tells the reader why the use of the cream is preferable to shaving : **No. cuts, No quick stubble, No razor shadow.** Gala of London's Liquid Silk Nail Polish is, according to the body copy of its advertisement, **Smooth. With a shimmer. But never a Streak.**

Signature lines which attractively and pithily carry the burden of the advertisement, and are often catchy slogans, almost invariably have disjunctive grammar :

Air-India the airline for youth
Utterly, butterly delicious (Amul Butter)
Britannia-India's best biscuits
Horlicks-the Great Nourisher
A little build in every bite
Cutex-the contemporary classic for your lips and nails
Thoroughly modern modella

It will be seen that in four of the above examples two noun groups have been placed in apposition, a construction which is highly characteristic of advertising language and especially of signature lines. The name of fhe product is followed by one of its most inviting qualities the purpose apparently being to associate the brand-name with a 'tag-line' which can be easily remembered.

Lexical Violation

Lexical deviations constitute one of the richest sources for the creative copywriter. He can have recourse to Functional Conversion or he can introduce neologisms and nonce-formations or else he can make use of anomalous lexical collection to satisfy his need to express himself imaginatively.

(1) Functional Conversion :

Geoffrey Leech who describes functional conversion as 'zero affixation', defines it thus : "Functional conversion consists in adapting an item to a new grammatical function."[8] Since the order of words in a sentence is more or less fixed, functional shifts within the sentence do not endanger intelligibility greatly. When one part of speech operates as another part of speech the language acquires fresh vitality and variety and this is exactly what the copywriter is after.

The conversion of nouns into verbs, which has become very common in the general use of English, is fairly frequent in advertising language also. **DCM textiles have chaotic symmetries that screwball the eye**. 'Screwball', used colloquially in the U. S. both as noun and as adjective means crazy person/crazy, here obviously means that the eye would become crazy, with the sight of the 'chaotic symmetries'. **Cream in the loved look** says a Lakme Cold Cream advertisement, converting a noun into a verb, as is also done when Morarjee prints claim that they **tailor beautifully**. While 'tailor' as a verb is surprisingly infrequent in advertising English, its frequency in general use in much higher. The same observation is true of the noun 'wheei' as in **whee-eel away the hours**, the headlines of a Nirester advertisement with the visual lay-out of a dashing young man with sunglasses, on a motorcycle.[9] Nirlon yarn and Shree Shakti Mills are said to be **perfectly partnered**.

The only two examples of the conversion of an adjective into a verb, among the 350 samples collected were : **Gay up your parties with Gold Spot** and **Lavish it on** (Nivea Creme). Here as in the case of 'cream in' and 'wheel away' the conversion process is complete because the new verb has been followed with a preposition to make it a verbal idiom.

The use of pronouns in positions where only nouns normally operate, i.e. following pre-modifying adjectives, is now coming into vogue in advertising English. Groups like For a more **beautiful you** and **Voodoo for a more exciting You** are becoming more and more frequent in signature lines. In **an elusive something** again a pronoun has been used as a noun with an adjectival pre-modifier.

In the vocabulary of advertising the word class which has pride of place is the adjective. The copywriter finds that most of the adjectives in general use have been put to so much use that they are completely squeezed of their semantic

value. He has recourse, therefore, to new epithets out of his imagination–often multiple–hyphenated adjectival groups which are placed before headwords to form new expressive single pre–modifiers. Often adjectival clauses which would normally be introduced by a relative, 'who', 'whom', 'which', or 'that' are placed immediately before nouns. An extreme example is : **the now-you-see-through, now-you-don't drape** which can be expanded for clarification into 'drape through which now you can see; now you can't'. Gold Spot has, according to an advertisement, a **come–and–get–it** tang while Mafatlal's Nirester is described by its signature line as **the-get-away-from-it-all** yarn. In all these cases the length of the cognitive meanings would make it evident that great economy can be achieved by compression.

Nouns and pronouns denoting time often become adjectives in the hands of the imaginative copywriter. Bingo Cornflakes are said to be **the ideal anytime food for every family**. 'Today' is another word of the same class which functions as an adjective. Bata shoes use it rather self-consciously within inverted commas: **Styled and cut to fit the 'today' image,** while a Lakme Mascara body copy has **Today girls unite.**

A unique example of the formation of numerical adjectives is found in Limca (soft drinks) advertisements. The noun 'thirst' and the adjective 'thirsty' are employed here as numerical adjectives. One headline has **Love at thirst sight** followed by the subhead, 'Limca lovers start young', while another gives to Limca drinkers **thirst row** seats, both by analogy with 'first'.

The preposition 'in' is now often used as an adjective as in **the in crodw** This function of the preposition 'in' has become so wide that its classification as an illustration of grammatical conversion is soon likely to be remembered by linguists only.

(2) Neologisms :

Neologisms form by far the largest part of linguistic creativity with the help of lexical violations. Copywriters share with poets the prerogative to coin new words, most of which remain nonce-words, made up for a few occasions, unabsorbed by the standard language. A neologism, by extending rather than breaking the boundaries of the rules for the formation of words, widens the possibilities of expression. Both composition or compounding, and derivation or affixation are used to form neologisms.

Compounding and premodification help to increase the labelling function of the English common noun almost infinitely. The language of textile advertising makes much use of compounding, compound premodifiers being much more frequent than compound heads. In **touch-happy textures, flower-fresh voiles** and **quality-conscious mills** and the multiple-hyphen word **scratch-stain-heat-resistant,** the composition of the compounds is noun + adjective, while **wet-look** and **free-flappability** have adjective + noun compounds. Pre-modifiers made up of noun + past participle are quite common : **heaven-spun combinations, sun-kissed taste, orange-flavoured, earth-bred, sky-fed** and **sun-washed;** in **enriched-formula** the order is reversed. **Mind-blowing** and **eye-stopping** are adjectival compounds consisting of noun and present participle. A whole unit of action sometimes forms an adjective : **Mix-in-a-minute-Farex, pick-of-the-season-peas;** that **What-a-glorious-morning, happy-to-alive-feeling.** Compounds of the noun + preposition + noun type, though rarely used in textile advertising, are quite common in other fields of advertising : **Wall-to-wall carpeting, top-to-toe tenderness.**

While most of the compound adjectives so far mentioned are nonce-formations, used exclusively in advertising, others like **Two-in-one, crease-proof** (and other compounds with '-proof') and **ready-to-use** are so popular in general usage that they may well be called neologisms.

For compound heads the most popular formation is the combination of two nouns : **pace-setters, fantasy weave, mastercraftsmen, woman power, silk-power, crease-resistance, skin magic, night cream** and **headstart** are compound heads most of which are in great vogue. Brand names consisting of noun + noun compounds are coming into fashion, often with a noun compounded with the manufacturer's trade-name as in the case of Amulspray and Bisonbra, maidenform, Sunsilk and Warlord (toy gun) which are brand names consisting of two nouns which together make up the trade name.

Affixation or the adding of a pre-fix or suffix to an existing word to form a new word, is extremely active in advertising English. The latin prefix 'Ultra-' seems to be a special favourite of the cosmetics copywriter. **Lakme's Ultra-glow** and **Ultra-frost Lip Colours** are guaranteed to make an **Ultra-exciting you. Ultra-modern, ultra-sophisticated** and **ultra-glamorous,** are also found in this regi-

ster while a fairly new entrant is **ultra-absorbent.** Textile advertising has prefixes like 'pre–' (**pre-shrunk),** 'non' **(non-iron)** and 'anti–' (**anti-shrink, anti-crease**).

Among adjectival derivatives found chiefly or only in advertising language, the –y forms are the most numerous : **cheesy, lemoni** (for lemony), and some slang words expressing approval like **groovy, snazzy. swizzy** and **zingi** (for zingy) are some of the more remarkable ones. An instance of the suffix –'ness', which is gaining in popularity in general use also is **togetherness.** The limca addict admits **I'm a limcomaniac** and when he is intoxicated with Limca he confesses he has been on **limcotics.** The only two new uses of the suffix '–ise' were both from climatology : **tropicalise** and **monsoonise.**

(3) **Anomalous Lexical Collocation :**

The copywriter in search of a striking new adjective or noun often uses anomalous lexical collocation. An advertisment for Flexible Containers claims them to have, on the analogy of sex–appeal, **shelf–appeal,** while HMT Watches declare in their headline that at HMT beauty is never **dial–deep,** on the analogy of 'skin deep', The deviation consists in an unrestricted choice of nouns (shelf, dial) where only a noun from a limited list of nouns is normally used. The deviant occurrence is in contrast to the expected occurrence. In the second example the normal paradigm would be

skin knee shoulder ankle	deep

whereas the deviant noun 'dial' makes a new paradigm. Limca advertisements exploit the phonological similarity of the latter syllables of 'first' and 'thirst' to collocate 'thirst' with words usually collocated with 'first'. Their special blend is, according to the headline, **a thirst attraction. Come, get thirst aid** says its body copy.

Semantic Deviation

(1) **Illogicality :**

Semantic deviations, to some extent, help the copywriter to draw the attention of the attention of the reader to his product. Often the very illogicality of the advertising message makes it remarkable, because here "a piece of language is at odds with the immediate situation in which it occurs"[10], says Geoffrey Leech. He dilates later that "each use of language has what we may call Implications of

Context; i. e. it conveys information about the kind of situation in which it would occur." In **Halo spells beauty the world over,** 'spell' can be considered to be placed in a context where it does not normally occur. **Help yourself to some happiness** (Brooke Bond Tea) and **Pour yourself a happy day,** take the concept of happiness and its achievement into a context where they stand out in relief. **Tanjore speaks the finest Basmati (rice),** says an advertisment of a Hotel. The calculated absurdity of the slogan tickles the imagination of the reader but the message is clear. Two headlines of Lalbhai Group are also arresting because of their situational strangeness : **Texture is tenderness is quality is Lalbhai Group** and **Design is distinctiveness is quality is Lalbhai Group.**

(2) **Unqualified Comparatives :**

Advertising messages employ unqualified comparatives—comparative adjectives with nothing in the context—either in the text or in the visual-layout—to compare them with. This technique gives the impression that the product is in some way superior, but if we pause to ask the question, " Better than what ? ", we will be left without an answer. Randolph Quirk says that when an advertisment claims for example, that "Scientific experiments have proved that our product makes your clothes whiter", we must ask "Whiter than what ?"[11]

Examples of unrelated comparatives are numerous :

Singer Needles sew better, last longer, run cooler !
Modipon makes better yarn. Subhash makes better Nylon fabrics.
Aspro acts faster—faster and longer lasting relief.
Burnol heals faster.

(3) **Role Borrowing :**

Role borrowing, in which the linguistic features of one role are employed in another, and **register mixing,** where the registers of different linguistic roles are juxtaposed and often blended, are the preserves of the creative writer. Indian press advertising has started experimenting with this technique rather gingerly-very few advertisements make a wholesale use, i. e., for the whole text of the advertisement, of role borrowing, perhaps for fear that they may not be able to put the message across. Obron fabrics ran a series of advertisements in which the register of legal proceedings, or court room language to be more exact, was employed almost

throughout. The headlines of all these advertisements were the same : **The Case of the Man in Obron,** and numbered 1, 2, 3. The second 'case' is quoted below :

The Case of the Man in Obron.....2

High Arson

Judge : Mr. Prosecutor, I fail to understand how the accused can be charge-sheeted under Section 435 with having committed arson.

Defence Attorney : My submission too, My Lord, is that this case is not maintainable under Section 435, of the Indian Criminal Procedure Code.

Prosecutor : Allow me to explain, My Lord. This young man in OBRON suit planned his moves very carefully. He chose OBRON fabric for his suit because he knew that dressed in OBRON, he would look dashing, debonair, distinctive and irresistible to women. You are already aware of the high quality of OBRON fabric, its unique texture, its superb feel and its economic price. This young man now deliberately and knowingly set an innocent woman's mind on fire with dreams of matrimony and a glorious future. With that else, I ask you, can you charge him, except arson ?

Defence : These allegations are fantastic, totally absurd and absolutely frivolous. I submitt again that no charges can be framed against the accused.

Judge : After hearing both the parties, I agree with the Defence contention that the case is not maintainable. No charges can be framed against this young man who leaves this court witnout a stain on his character.

Voice in Court : Hurrah : (thunderous applause) Long live OBRON :

Woman in Cage : Don't quench the fire in me !

Judge : Quiet ! Order ! Court is dismissed !

Moral : All's well that ends well—when you are dressed in LD's suitings and shirtings.

A diluted version of the same register is used in an advertisement of Binaca Fluoride with the headline, **This tooth was murderd.** The bodycopy expands the theme : **In a ghastly way. By slow poisoning and the terrible truth never came out till the tooth did. Verdict : Wilful neglect. Inadequate brushing**

with an inadequate brush. The moral : If the owner had used Binaca Fluoride regularly, the tragedy would have been averted. The rest of the body copy uses only strictly advertising language. In this advertisement the registers of law and advertising have been mixed to a greater extent than is the case with the Obron advertisement.

A unique example of the employment of the language of space research, analogous to the language actually used in recent reports on moon-landing, occurs in a Swish Blades advertisement. The headline in this case too is an appropriate prelude to the language of the body copy ; **Operation Super Swish.** The sub-head continues :

Super Swish reports success on every count. The visual aid has the diagram of a razor landing on a line-sketch of a man's face with certain parts shaded. The body copy begins : **" Thanks to the thousands of photographs sent by the landing craft, the scientists were able to assemble the complete picture. Notice how the whole face falls into place and the cheeks are mapped. The chin emerges with astonishing clarity and brightness."** Another paragraph has : **" Super Swish cuts a corner of the moustache ..... and navigates beautifully around the curve of the mouth."** The language of astronautics, particularly that of lunar expeditions, is used here by the advertiser throughout the text. Another part of the main message has : **" The going was smoother than expected over the 'zone of qualms' and proved that the ravine of ' cuts and bruises ' is just an old wives' tale....."**

Role borrowing on a smaller scale is found in many advertisements. A DCM headline says : **Life's one big merry-go-round in DCM superia rubia and royal voile saris.** The visual layout has the picutre of a woman on a wooden horse in a merry-go-round, and this is the justification for the equestrian language of the rest of the message : **Fashion rides high in these sheerly superb saris..... that have a tight rein on the situation.....In a thoroughbred range of prints and colours.**

The register of cardplaying makes a Monaco Biscuits advertisement outstanding. The headline is : **Make a bid for monaco** and the body copy continues : **Monaco-the crisp salted biscuit that's aces high—So deal out Monaco for winning enjoyment at every session.**

Two unique instances of the use of biblical language in advertising are : **Give us this day our daily bread** with Amul Butter, and **Thou shalt forever be prosperous with Bank of Baroda.** The pronoun 'thou' (with the auxiliary 'shalt') is now restricted to religious English and "represents a deviation of descriptive importance, involving a restatement of the systems of number and person and the introduction of a new relation of concord...In terms of social meaning 'thou' has a high 'strangeness value' or 'connotative value', being fraught with overtones of piety, historical period, 'poeticalness' and so forth."[12]

Ambiguities in Advertising Language

The violation of language classified under the term Ambiguity spans all the three levels dealt with here–phonetic, linguistic and semantic. Empson describes ambiguity as "any verbal nuance, however slight, which gives room for alternative reactions to the same piece of language".[13] Homonymy, in which two different formal items have the same spoken or written realization, and Polysemy, multiple meaning, are the most common kinds of ambiguities found in Advertising, where, as in poetry, ambiguity adds to the linguistic repertoire of the composer. Geoffrey Leech says : "In informative or reasoned discourse, ambiguity is usually considered a fault to be eliminated. In poetry on the contrary, it is usually treated as a means of enriching the communicative resources of the language, by a superimposition or juxtaposition of alternative interpretations."[14]

Homonymy and polysemy may be lexical or grammatical. It is often difficult to decide whether an item under study should be classified under the one or the other head :

Shave after shave
Crest after shave

The second line here can have two interpretations : (1) Use Crest after your shave, or (2) Crest aftershave after all your shaves. The grammatical ambiguity may be thus analysed : In the first interpretation the structure is Noun + adverb + noun, whereas the grammatical pattern of the second interpretation is : Modifier + Compound Headword.

A Dunlopillo advertisement cryptically states : **Rest Assured**, which again can be interpreted grammatically in two ways : (1) Like a newspaper headline where the verb 'to be' is understood, i.e., On Dunlopillo your rest is assured or (2) It

can also be a comforting promise from the advertiser that Dunlopillo will fulfil your expectations of it. **Things you can't do without, Poysha can,** is the signature line of a Poysha Can advertisement. Here again 'Poysha can' may mean that it is possible for Poysha (to do without ?) or 'Poysha can' may be expanded to mean "One of the things that you cannot do without is Poysha can." 'Can' therefore may be either an auxilliary with the finite verb understood, or a noun with the modifier Poysha.

A Co-optex fabrics headline has : **Butterfly covers you where it's important.** The ambiguity here does not become apparent at once. The obvious meaning would be that Butterfly covers you where it is important to cover you (where=the part(s) of the body). But the text which follows the head line gives the latter a new slant : **A party, reception, dinner or special date,** thus making the head-line mean "Butterfly covers you when you go to important places". Here, as in the previous example, the ambiguity rests on the interpretation of a lexical item.

An interesting ambiguity where more than one word is open to double interpretation is the Standard Battery slogan which compares the battery to a prison because in both cases **the charge never escapes from the cell.** The lexical homonymy of the three words 'charge', 'escapes' and 'cell' enriches the slogau immeasurably. The syntactic analysis of the two Interpretations would be the same : Determiner + headword + Adverb + predicator + preposition + determiner + headword, or Subject + Predicator + Adjunct (SPA).

Sungloss is tops would obviously mean in colloquial language that Sungloss is the best. But the statement is followed by : **Dining table tops, Coffee table tops, Dressing table tops, Kitchen table tops,** making the first line mean that Sungloss can make table tops of the kinds described in the noun groups.

Advertising messages often use words and groups which can be interpreted idiomatically as well as literally. In the case of the Nirlon headline **Who hits the mark with Nirlon ?** (With the reply "Nirfabrics"), the idiomatic meaning of "hits the mark" suggests the high quality of the fabric, while the pictorial aid to the written message has a man with bow and arrow, thus implying the literal meaning of the phrase. Another headline which make use of the same device is **Formica come through with flying colours.** Here again, the idiomatic meaning of the phrase suggesting the commercial success of Formica is supplemented by its literal

meaning as implied by both the visual aid as well as by the rest of the message. Flying is associated with real flying (moving through the air with wings or mechanical power), because of the presence of Air-India's symbol, the small maharaja, on a Formica-topped table. The body copy also makes it clear that Formica has been used by Air-India in their new building in Bombay.

Puns may arise out of homonymy or polysemy. In the Air-India advertisement just mentioned the bodycopy says : **He likes his decor a flight above the rest**. At the conceptual level there are two structures, the two interpretations being (1) the act of flying and (2) an architectural level, exploited here. In **Gentlemen prefer Bonds**, the pun on the word 'prefer' is not so obvious as in the last example. 'Prefer' here could mean either 'promote' (the use of, by wearing Bonds clothes) or it may have its straight meaning, 'like better'. 'Who cares if your hair is different ?' asks a headline and the answer is **Sunsilk cares with three special Shampoos.** The two meanings of 'care' (1) feel anxiety about and (2) look after, are both relevant to the context here. Again in a Dermacare Whitening Cream advertisement, **Be fair to your complexion**, 'fair' may mean 'just' or 'fair complexion'.

We have so far been dealing with various kind of deviation in advertising language, on the linguistic assumption of uniformity which makes analysis easier. Linguistic deviations can be explained by refefence to scales of institutiona delicacy. "A linguistic feature", says Leech,[15] "will be highly deviant if it is unique to a low-generality variety of English; if it is common to a number of low-generality varieties, or unique to variety of higher generality, it is to that extent less deviant. The least deviant or 'most normal' feature of all will be that which is common to all varieties of English." Transformationa grammar, which explains the concept of grammaticality, can also explain deviance by recognizing the depth of the generative process at which a construction deviates from normal. However, the answer to the question what is 'grammatical' or 'acceptable ' is becoming more and more doubtful. The problem is intensified by the fact that very often what is ungrammatical may be acceptable. "Even if 'correct' were deemed in the social situation to be more or less equivalent to 'acceptable' (in the same sense as 'correct' dress and 'correct' table manners), from a purely linguistic angle, the two notions need to be dissociated."[16] This, in fact, is the purpose behind the assessment of the attitudes of a number of

native speakers to certain disputed English usages, made by the Institute of Education English Research Group, University of Newcastle upon Tyne.[17] Again "the question arises whether the descriptive norm should be based on informant reaction (the so-called "intitution" of the native speaker) or on distribution-frequency measures, or on criteria related to simplicity or accessibility of the description.[18] There seems to be a great need for a grammar which can account for and thus predict all deviation within a context. Deviant structures can be systematized either by simply listing them or as Thorne suggests by "stating the rules which would actually generate those structures."[19] Such a grammar will, however, lose all definable contact with 'normal' or 'non-deviant' grammar. Therefore till we have a grammar which can explain deviation and is at the same time related to normal grammar, deviation will belong to a subsystem rather to any accepted system.[20]

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2. Quoted by Walter Weir, **On the Writing of Advertising** (New York: McGraw-Hill Book Company, Inc., 1960), p. 16.
3. Samuel R. Levin, "The Conventions of Poetry" **Literary Style**, Ed. Seymour Chaiman, (New York: Oxford University Press), 1971, p. 189.
4. Based on the table in M.A.K. Halliday, Angus McIntosh and Peter Strevens, **The Linguistic Sciences and Language Teaching** (London: Longman Group Limited, 1964), p. 18.
5. Nils Brik Enkvist, "On the Place of Style in Some Linguistic Theories, **Literary Style**, **op. cit.**, p. 55.
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8. Geoffrey N. Leech, **A Linguistic Guide to English Poetry,** (London: Longman Group Limited, 1969), p. 43.
9. 'Wheel away' may also be considered to be a phonological deviation of 'while away'.

10. Geoffrey N. Leech, **op. cit.,** p. 183.

11. Randolph Quirk, **The Use of English,** (London: Longmans, Green and Co. Ltd., 1962), pp. 252–253. Quirk adds, "Whiter than when they are washed under absolutely identical conditions, using every other relevant product on the market ? Or merely whiter than when they are washed in cold water without soap ? Or perhaps, indeed, just whiter than they were before they were washed !"

12. G.N. Leech, "Linguistics and the Figures of Rhetoric", **Essays on Style and Language.** Ed. Roger Fowler, (London: Routledge and Kegan Paul, 1966), pp. 139–40.

13. W. Empson, **Seven Types of Ambiguity,** (London, 1953) p. 1, cited by G.N. Leech, **A Linguistic Guide to English Poetry, op. cit.,** p. 205.

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15. Geoffrey N. Leech, "Linguistics and the Figures of Rhetoric". **Essays on Style and Language, op. cit.,** p. 139.

16. W.H. Mittins et al, **Attitudes to English Usage,** (London: Oxford University Press, 1970), p. 2.

17. Referred to above, 16. Respondents of various categories were asked to estimate the favourableness or otherwise of their spontaneous reaction to each usage in Informal Speech, Informal writing, Formal speech, Formal Writing. The survey brings out the need for a clear distinction between grammaticality and acceptability.

18. Charles A Ferguson, **Language Structure and Language Use** (Stanford, California: Stanford University Press, 1971), p. 194.

19. J.P. Thorne, Generative Grammar and Stylistic Analysis, in **New Horizons in Linguistics,** Ed. John Lyons, (Middlesex, England: Penguin Book Ltd., 1970), p. 193. Thorne suggests that each poem should have its own grammar which would generate the constructions of that particular poem, and which would thus state its interpretation.

20. See Nils Erik Enkvist, On the Place of Style in Some Linguistic Theories, **op. cit.,** p. 54.

20

BILINEAR TRANSFORMATION

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Introduction

Mathematics, unlike physics, is an exact science. The value of π the ratio of circumference to diameter of a circle, calculated to 10,000 decimal places, (and this has been done ![1]) must turn out to be the same whether the calculations are carried out in India or in America, But two students performing the experiment of simple pendulum, on the same table, will most probably get different values of the gravitational acceleration. The possibility of deviation from the expected behaviour in inexact sciences have led to a number of important inventions.

Kamerlingh Onnes knew well that the resistance of a metal decreases with temperature; even then, after liquifying helium for the first time in 1908, he was eager to study the variation of resistance in the new range of temperatures below 4·2° K. He should have anticipated the value of resistance considerably lower than at higher temperatures. To his surprise he observed that 'Mercury has passed into a new state' at 4.2° K, 'which on account of its extraordinary electrical

properties may be called the superconductive state.'[2] Thus he was led to the discovery of superconductivity and was awarded Nobel prize in 1913.

In recent years theory of conformal bilinear mapping is applied[6] to the case of conventional ellipsometry resulting in the "generalized ellipsometry". The development of this new branch is based on the equation relating the polarization state of the light beam incident on the given optical system to the polarization state of the light beam emerging from that system. This transformation of the polarization state is the conformal bilinear transformation. Thus, when studying generalized ellipsometry, we were tempted to read in detail the theory of bilinear transformation.

According to the theory, bilinear transformation transforms circles into circles and lines into lines; a few mathematical steps are involved in proving this.[3] But when a person dealing with an inexact science tries to solve a problem of an exact science, the fear of the presence of inexactness, however small, will still be with him. This fear, when reading bilinear transformation, initiated the question: how exactly does the theory of bilinear transformation apply to a circle ? Does a circle (on a graph paper in the form of a curve rather than on a plain paper in the form of a formula) really transform into an exact circle ? And this resulted in the study presented in this article; we may call it a 'practical in mathematics'.

Insted of studying the transformation of a circle, we could have studied the case of any other curve, say, ellipse. Since the theory of generalized ellipsometry most frequently involves the transformation of a circle, we have preferred to study the case of a circle only.

Bilinear transformation

The transformation,

$$w = \frac{az + b}{cz + d}, \quad ad-bc \neq 0 \qquad (1)$$

is called a linear fractional transformation. Here a, b, c, d are complex constants; also $z = x + iy$ and $w = u + iv$.

Equation (1) can also be expressed in the form

$$Azw + Bz + Cw + D = 0 \qquad (2)$$

This equation is linear in both z and w, that is, it is bilinear in z and w. Hence transformation represented by Eq. (1) is also called the bilinear transformation. It is the most general type of transformation for which one and only one value of z corresponds to each value of w, and conversely. The bilinear tranformation was first studied by Mobius and is also known as the Mobius transformation. This transformation can be written as

$$w = \frac{a}{c} + \frac{b - ad/c}{cz + d} \tag{3}$$

Writing $z' = cz + d$ and (4)

$$z'' = \frac{1}{z'} , \tag{5}$$

we can write

$$w = \frac{a}{c} + \frac{bc - ad}{c} z'' \tag{6}$$

Thus a single transformation (1) is equivalent to three successive transformations (4), (5), (6). Equation (4) represents a general linear transformation consisting of a rotation through the angle arg(c) and a magnification or contraction (homothetic mapping[4]) by the factor |c|; this is followed by translation defined by the vector d. The homothetic transformation causes the same change in scale for the abscissae and the ordinates. Equation (2) is an inverse transformation causing inversion with respect to a unit circle followed by a reflection in the real axis. This transformation transforms circles (not passing through origin) into circles. The third transformation, Eq. (6), is again a linear transformation transforming circles into circles, with rotation, translation and magnification or contraction. Three successive transformations (4), (5), (6), thus transform a circle in z-plane (z-sphere[5]) into circle in w-plane (w-sphere) and converse, by the processes of translation, rotation and reflection. This circle property is the most important feature of bilinear mappings.[6] Many transformations, including the general linear and inversion, are special cases of bilinear transformation.

Formulation of the problem

We first tried to study the bilinear transformation starting with a circle on z-plane and cosidering seven points on the semi-circle, including two diametrically

opposite points. Equation (4) transformed the circle in z-plane into a circle in w-plane. However, Eq, (5) led to the points that did not exactly lie on the circumference of a circle. it was suggested[7] that the error may be due to inaccuracy in reading the points on the semi-circle in z-plane itself. Also it was thought that the semi-circle should transform into a semi-circle, such that the two diametrically opposite points in z-plane form two diametrically opposite points in z''-plane, However, this is not necessarily true[4,8]. Hence it was decided to study the whole problem theoretically only. The radius of circle in z-plane is so selected (5 units) that a few (four) more points can be read exactly on the graph paper. All calculations are done to seven decimal places using MOSCAL 1400.

Circle in z-plane

This circle is selected to have its centre at the origin, so its equation is $x^2 + y^2 = r^2$ where r=5 units, y is calculated using eleven different values of x corresponding to points a to k lying on a semi-circle, where points (Table I) a and k are diametrically opposite points.

The complex constants have the following values:

$a = 1 + i$ $\qquad$ $b = 1 + 2\,i$,

$c = 3 + 4\,i$, $\qquad$ $d = 2 + i$

satisfying the condition that $ad - bc \neq 0$.

Circle in z' - plane

Circle in z-plane with centre at $(x_0, y_0) \equiv (0, 0)$ is transformed into a circle in z'-plane due to transformation (4). The centre of this circle will be at $(x'_0, y_0') \equiv (2, 1)$ as a result of translation determined by the costant d and its equation will be

$$(x' - 2)^2 + (y' - 1)^2 = 625 \qquad (7)$$

This circle is an expansion of the original circle by $|c| = 5$,

Thus the radius of the new circle is $r' = 5 \times 5 = 25$ units.

Rotation of this circle will be by $\theta = \arg(c) = 53° 08'$. Also after substituting the values of c and d in (3) the real and imaginary parts of z' are obtained as

$x' = 3x - 4y + 2$,

$y' = 4x + 3y + 1$

TABLE I

Coordinates Of Points In z-, z'-, z''- And w-planes

Point	z-plane		z'-plane		z''-plane		w-plane	
	x	y	x'	y'	x''	y''	u	v
a	5.0	0.0	17.0	21.0	0.0232876	-0.0287671	0.3410957	-0.0095901
b	4.0	3.0	2.0	26.0	0.0029411	-0.0382352	0.3499997	-0.0500001
c	3.0	4.0	-5.0	25.0	-0.0076923	-0.0384615	0.3461538	-0.0692313
d	2.0	4.5825756	-10.3303024	22.7477268	-0.0165503	-0.0364445	0.3389800	-0.0843683
e	1.0	4.8989794	-14.5959176	19.6969382	-0.0242856	-0.0327730	0.3292772	-0.0968232
f	0.0	5.0	-18.0	16.0	-0.0310344	-0.0275862	0.3172414	-0.1068963
g	-1.0	4.8989794	-20.5959176	11.6969382	-0.0367121	-0.0208497	0.3028446	-0.1144215
h	-2.0	4.5825756	-22.3303024	6.7477268	-0.0410352	-0.0123999	0.2859058	-0.1188232
i	-3.0	4.0	-23.0	1.0	-0.0433962	-0.0018867	0.2660376	-0.1188677
j	-4.0	3.0	-22.0	-6.0	-0.0423076	0.0115384	0.2423079	-0.1115383
k	-5.0	0.0	-13.0	-19.0	-0.0245283	0.0358490	0.2056605	-0.0698113

These values are listed in Table I. Points (x', y') must satisfy Eq. (7) if they lie on the circumference of a circle. It is seen (Table II) that they lie exactly on a semi-circle.

Circle in z'' – plane

Since this is an inverse tranformation, given by Eq. (5) from the z' – plane, it is more interesting than the linear transformation and has proved to be a problem-creating one. The theory tells only about its radius r'' due to inversion with respect to unit circle :

$r'' = 1/r' = 0.04$ unit

Nothing is known about its centre (x''_0, y''_0). Hence the set of eleven points (x'', y'') is first obtained using the relations

$$x'' = x' / (x'^2 + y'^2)$$
$$y'' = -y' / (x'^2 + y'^2)$$

These points are also represented in Table I. How to prove that these points lie on the circumference of a semi-circle ? We have followed the following procedure. If any points lie on the circumference of a circle of radius r'' = 0.04 and centre at (x''_0, y''_0) it must satisfy the equation

$$(x'' - x''_0)^2 + (y'' - y''_0)^2 = r''^2 = 0.0016 \qquad \ldots(8)$$

Hence the centre (x''_0, y''_0) is obtained by solving two simultaneous equations by using two different points (x'', y'') :

$$x''_0 = \alpha - \beta y''_0 \qquad \ldots(9)$$

$$y''_0 = \frac{-Q \pm \sqrt{Q^2 - 4PR}}{2P} \qquad \ldots(10)$$

$$P = 1 + \beta^2$$

$$Q = 2\beta (x''_1 - \alpha) - 2y''_1$$

$$R = (x''_1 - \alpha) + y''^2_1 - 0.0016$$

$$\alpha = \frac{x''^2_1 - x''^2_2 + y''^2_1 - y''^2_2}{2 (x''_1 - x''_2)}$$

$$\beta = \frac{y''_1 - y''_2}{x''_1 - x''_1}$$

TABLE II

Values Of r'^2 For All Points

Point	r'^2
a	625.0
b	625.0
c	625.0
d	624.9999781
e	624.9999789
f	625.0
g	624.9999792
h	624.9999781
i	625.0
j	625.0
k	625.0

TABLE III

Coordinates Of The Centre

In z'' – plane

Points	x_0''	y_0''
a,b	–0.0030842 *	0.0013101 *
	0.0658322	–0.0683118
c,d	–0.0033056 *	0.0012983 *
	–0.0209523	–0.0762007
e,f	–0.0034241 *	0.0013576 *
	–0.0518984	–0.0617149
g,h	–0.0035126 *	0.0014633 *
	–0.0742318	–0.0347182
i, j	0.0821533	0.0080135
	–0.0035500 *	0.0016398 *

Corresponding to two values of y''_0, we get two values of x''_0 — this in turn leads to four possible centres of circle. Moreover, having a set of eleven points one can form 110 centres (x''_0, y''_0) to be examined; we have restricted our calculations to only five such points, but difficulty of four possible centres is solved by simple arguments.

Table III represents possible values of x''_0, y''_0 obtained by substituing the values of the coordinates (x''_1, y''_1), (x''_2, y''_2) for points e, f. Each centre must satisfy the equation of the form

$$(x''_{1,2} - x''_{01,2})^2 + (y''_{1,2} - y''_{01,2})^2 = 0.0016 \qquad \ldots(11)$$

where $x''_{1,2}$ stands for x''_1 or x''_2 and $x''_{01,2}$ for x''_{01} or x''_{02} respectively; similarly $y''_{1,2}$ and $y''_{01,2}$.

We have eight such equations as shown in Table IV. The table also shows that only two, out of four centres satisfy Eq. (10). We are now left with the possibility of only two centres (x''_{01}, y''_{01}) and (x''_{02}, y''_{02}) where x''_{01} or x''_{02} is obtained by substituting the value of y''_{01} or y''_{02} in Eq. (8).

For any point to be a centre of the circle in z'' – plane, it must satisfy Eq. (11) where (x'', y'') is any point from a to k. These calculations, using two centres (x''_0, y''_0) obtained from points e, f are presented in Table V. It is clearly seen that only one centre satisfies Eq. (11), at least to a fair degree of accuracy, for all the eleven points from a to k. We may call this point a true centre, noting that 110 such true centres are possible, out of which five are marked with asterisk in Table III. Considering the deviation from 0.0016 such as those listed in Table IV, the points (x''_0, y''_0) calculated using the coordinates of points e, f is taken as the most reliable true centre.

But why these deviations even though mathematics is an exact science ? The only answer lies in the limitation imposed by the selection of only seven decimal places. We are thus led to the need of performing all calculations upto 10, 12 or even more decimal places, that is, to the process of going from desk calculator to the computer.

Circle in w – plane :

This circle is the result of the general linear transformation given by Eq. (6). The centre of this circle relative to the centre of the circle in z'' – plane is shifted by an amount determined by

TABLE IV

Possible Values Of r''^2 Using Four Centeres

(Points e, f)

L. H. S. of eq.(11)	r''^2
$(x''_1 - x''_{01})^2 + (y''_1 - y''_{01})^2$	0.0016000
$(x''_1 - x''_{01})^2 + (y''_1 - y''_{02})^2$	0.0012728
$(x''_1 - x''_{02})^2 + (y''_1 - y''_{01})^2$	0.0019272
$(x''_1 - x''_{02})^2 + (y''_1 - y''_{02})^2$	0.0016000
$(x''_2 - x''_{01})^2 + (y''_2 - y''_{01})^2$	0.0016000
$(x''_2 - x''_{01})^2 + (y''_2 - y''_{02})^2$	0.0019270
$(x''_2 - x''_{02})^2 + (y''_2 - y''_{01})^2$	0.0012730
$(x''_2 - x''_{02})^2 + (y''_2 - y''_{02})^2$	0.0016000

TABLE V

L. H. S. Of Eq.(11) Using Two Centres

(Points e, f)

Point	L. H. S. of eq.(11) using $x''_0 = -0.0034241$ $y''_0 = 0.0013576$	 $x''_0 = -0.0518984$ $y''_0 = -0.0617149$
a	0.0016209	0.0067384
b	0.0016080	0.0035585
c	0.0016037	0.0024948
d	0.0016011	0.0018879
e	0.0016000	0.0016000
f	0.0016000	0.0016000
g	0.0016011	0.0019005
h	0.0016037	0.0025499
i	0.0016082	0.0036516
j	0.0016155	0.0054579
k	0.0016349	0.0102678

$$\frac{a}{c} = 0.28 - 0.04i$$

Hence the final circle has its centre (X, Y) given by

$$(X, Y) \equiv (x''_0 + 0.28,\ y''_0 - 0.04)$$

that is

$$(X, Y) \equiv (0.2765759, -0.0386424)$$

where the centre (x''_0, y''_0) obtained by using the coordinates of points e, f is used. Also, the expansion of this circle is by an amount

$$\left| \frac{bc - ad}{c} \right| = 1.8439088$$

Hence the redius of the final circle is

$$R = r''. \left| \frac{bc - ad}{c} \right|$$

that is, R = 0.0741562 unit.

The circle is rotated through an angle

$$\phi = 72^\circ\ 40'$$

with respect to the previous circle in z'' – plane.

The coordinates (u, v) of the points on this circle are calculated using the relations

$$u = 0.4\ x'' - 1.8\ y'' + 0.28$$
$$v = 1.8\ x'' + 0.4\ y'' - 0.04$$

and are listed in the last two columns of Table I.

It is interesting at this stage to note that the points (u, v) are the result of successive transformations from the z – plane to z' – , z'' – and w – plane. However, if the transformation from the z – plane to the w – plane is considered as a direct one, using Eq. (1), the points (u, v) can be calculated using the relations,

$$u = \frac{EG + FH}{G^2 + H^2} \qquad \ldots (12)$$

$$v = \frac{FG - EH}{G^2 + H^2} \qquad \ldots (13)$$

where

$$E = x - y + 1$$

$$F = x + y + 2$$

$$G = 3x - 4y + 2$$

$$H = 4x + 3y + 1$$

using the values of a, b, c, d given earlier.

The results of these calculations, listed in Table VI agree well with the values of u, v in Table I and this verifies the correctness of the methods for both sets of calculations.

We are now left with the job of proving that all eleven points (u, v) lie on the circumference of a circle, the equation of which would be,

$$(u - X)^2 + (v - Y)^2 = R^2 \qquad ...(14)$$

The L. H. S. of this equation is calculated, substituting the values of x, y, to obtain the radius R of the final circle (Table VII). The deviation of calculated value from the expected value, R = 0.0741562 unit, is again attributed to the use of only seven decimal places and it is concluded that points (u. v) from a circle.

Plan for further work

It is necessary to work with an accuracy of more than seven decimal places. Also a complete circle, instead of a semi-circle, must be considered. If 20 points on this circle (in the z – plane) are considered, the true centres for all 380 possible combinations of points must be calculated. Each true centre may be used to calculate the L. H. S. of Eq. (11) in order to verify its trueness. That true point which gives $r''^2 = 0.0016$ most accurately for a set of 20 values may finally be taken as the centre of circle in the w – plane.

We are, therefore, planning to computerise the program for CDC 3600.

Arguments, similar to those for finding the centre of the circle in z'' – plane, apply to the coordinates (u, v) of points in the w – plane to obtain the coordinates of the centre (X, Y). It would be interesting to compare the centers (X, Y) obtained by both methods.

TABLE VI

Points (u, v) Using Direct Transformation

Point	u	v
a	0.3410958	-0.0095890
b	0.3500000	-0.0500000
c	0.3461538	-0.0692307
d	0.3389799	-0.0843684
e	0.3292772	-0.0968233
f	0.3172413	-0.1068965
g	0.3028447	-0.1144218
h	0.2859058	-0.1188233
i	0.2660377	-0.1188679
j	0.2423076	-0.1115384
k	0.2056603	-0.0698113

TABLE VII

Calculated Values Of R

Point	R
a	0.0707587
b	0.0742960
c	0.0760039
d	0.0773627
e	0.0785009
f	0.0794487
g	0.0802022
h	0.0807211
i	0.0809135
j	0.0805481
k	0 0774622

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सूरत की हिन्दी संत–कवयित्रियाँ

—डॉ. कान्तिकुमार भट्ट

एम. ए.; पी. एच. डी.; साहित्यरत्न

एम. आर. आर्ट्स एन्ड साइन्स कॉलेज, **राजपीपला**

हिन्दी एवं गुजराती के मध्यकालीन साहित्य के इतिहासों में एकमात्र मीरांबाई के सिवा शायद ही किसी अन्य स्त्री–कवि के नाम का उल्लेख प्राप्त होता है। एक मीरांबाई इस क्षेत्र में हिन्दी ही नहीं गुजराती और राजस्थानी साहित्य का गौरव बढ़ाती हैं। गुजराती साहित्य के इतिहासकार श्री कृष्णलाल झवेरी ने गुजरात की एकमात्र संत–कवयित्री के रूप में मीरां का उल्लेख किया है। हिन्दी मध्यकालीन साहित्य के इतिहासों में मीरां के सिवा अन्य किसी संत–कतयित्री का उल्लेख नहीं है।

डॉ. अम्बाशंकर नागर ने अपने प्रबन्ध 'गुजरात की हिन्दी सेवा' में गुजरात के संत कवियों की हिन्दी वाणी का अनुसंधान किया है। इसमें भी एकमात्र मीरां का उल्लेख है। डॉ. रामकुमार गुप्त के प्रबंध 'गुजरात के संत कवियों की हिन्दी साहित्य को देन' में पूर्वमध्यकाल में मीरां तथा उत्तरमध्यकाल में एक संत–कवयित्री गवरी बाई का वृत्त दिया गया है। डॉ. मदनकुमार जानी ने 'राजस्थान एवं गुजरात के मध्यकालीन संत एवं भक्त कवि' विषय पर अनुसंधान किया है। मीरांबाई का जन्मस्थान राजस्थान था, इसलिये उन्होंने मीरां का उल्लेख राजस्थानी संतों में किया है।

सारा मध्यकालीन संत–साहित्य अभी प्रकाश में नहीं आया है। विशेषकर अहिन्दीभाषी प्रदेशों में पड़े हिन्दी साहित्य को प्रकाश में आने का अवसर कम है। मध्यकालीन संतों की हिन्दी में लिखी विपुल संतवाणी गुजरात में अप्रकाशित पड़ी है। इन संतों में अनेक संत–कवयित्रियाँ भी थीं। उनकी वाणी भी प्राप्त होती है। इनमें अन्नपूर्णादेवी और तृष्णावती का समय मीरांबाई से पूर्व है। हुरादेवी मीरां की समकालीन है। मदलेखा तथा चन्द्रावती स्वामी तेजानन्दजी की समकालीन है। स्वामीजी का आगमन खरवासा गाँव में वि. सं. १६१२ में हुआ था। वि. सं. १६८० में उन्होंने समाधि ले ली थी; इसलिये इन दोनों का समय लगभग यही मानना चाहिए। यह सत्य है कि इन कवयित्रियों में से किसी ने मीरांबाई जैसी प्रसिद्धि प्राप्त नहीं की थी; किन्तु मीरां की प्रसिद्धि का मूल

कारण उनकी कविता नहीं किन्तु भक्तिभावना थी। राजस्थान के महाप्रतापी राणा वंश की पुत्रवधू संतों की उपस्थिति में भगवान की मूर्ति के आगे नृत्य करती थी, यह बात ही उस काल में असाधारण थी। इस स्थिति ने मीरां को इतना प्रसिद्ध कर दिया। इनकी तुलना में सूरत की ये कवयित्रियाँ निम्न जाति की और सर्वसाधारण जनसमुदाय से आती थीं, किन्तु उनकी वाणी गुणों में अन्य सन्तों की वाणी से कम नहीं थी। इनमें भी सन्त कवयित्री लाजवन्ती और चन्द्रावती की वाणी का माधुर्य दर्शनीय है।

हिन्दी साहित्य के पूर्व मध्यकाल में गुजरात में हिन्दी भाषा में जो सन्त-साहित्य की रचना हुई, उसमें एक मात्र सूरत में सन्तों के तीन प्रमुख संस्थान थे। महत्त्व की दृष्टि से सन्तकवि दुलाराम ने निर्वाण अखाड़ा को प्रथम, लोचन-आश्रम को द्वितीय तथा तेजानन्दजी के स्थान को तीसरा क्रम दिया है।

इन स्थानों में अनेक सन्त निवास करते थे। जो कवि थे, सन्तवाणी की रचना करते थे। रात को भजन करते थे। मेले भी लगते थे। मेले में अलख दरबार भी लगता था। गुजरात में अनेक सन्त-कवयित्रियाँ हुई थीं। यहाँ सूरत से सम्बन्ध रखनेवाली कवयित्रियों का ही उल्लेख किया गया है। अन्य सन्त-कवयित्रियों में पाटण की एक प्रेमाबाई (संवत् १६००-१६५२) पालनपुर के सन्त बाबा दीनदरवेश की शिष्या मदनावती, पाटण के लालसाहब की शिष्या ओखा, डुंगरपुर की गवरीबाई तथा बड़ौदा की सन्त-कवयित्री बाराणसी प्रमुख है।

अन्नपूर्णा : (वि. सं. १५४०-१५६३)

इनका जन्म सूरत में वि. सं. इ. १५४० में हुआ था। तेवीस वर्ष की अल्पायु (वि. सं. १५६३) में उन्होंने देहत्याग किया था। उनके चरित्र में दुलाराम ने उनके पिछले जन्म की कथा भी लिखी है। पिता की मृत्यु हो जाने पर निर्वाण साहब के चरणों में उन्हें रखकर उनकी माता सती हो गई थी। सन्त निर्वाण साहब की छाया में उनको सात्विक संस्कार प्राप्त हुए थे। ग्यारह वर्ष की अल्पायु में उन्होंने उपासना और ध्यान सीख लिया था। ये पहले सन्तों के भजन गाती थीं। धीरे धीरे स्वयं रचनाएँ करके गाने लगीं। उन्होंने निम्नांकित साखी में अपने गुरु की शक्ति को अंजलि दी है।

"अगम गति गुरुदेव की, काहु लहे न पार।
अन्नपूर्णा अबूझ को, सद्गुरु लियो उबार॥"

उनकी अप्रसिद्ध वाणी में से एक पद निम्नांकित है।

पद

"साहब! तुम हो गरीब निवाज, रखो अनुज की लाज॥टेक॥
अशरण शरण जानके आयी, द्वार खड़ी हूँ आज॥१॥
मैं अनाथ की बैया ग्रहोरी, मेहर करो महाराज॥२॥
तुम बिन जग में कोई न मेरा, सद्गुरु हो सुखसाज॥३॥
'अन्नपूर्णा' को लियो उबारी, डूबत तारो जहाज॥४॥

तृष्णावती : (वि. सं. १५३७–१५७०)

सन्तों के चरित्र–लेखक दुलाराम ने इनका चरित्र भी लिखा था। उनके जन्म तथा मृत्यु की निश्चित तिथियाँ अप्राप्य हैं। ये निर्वाण साहब की शिष्या थीं। सन्त निर्वाण साहब वि. सं. १५३७ में सूरत आये थे और वि. सं. १५७० में उन्होंने जीवन्त समाधि ली थी। अतः तृष्णावती का भी यही समय लिया गया है।

तृष्णावती के जीवन की कथा अत्यंत रूमानी है। अपने पूर्व जन्म में परमार चित्रसेन से उन्हें प्रेम हुआ था। ये जाति की ब्राह्मण थीं। जाति भेद के कारण उनका विवाह सम्पन्न न हुआ। अन्यत्र विवाह हो जाने के कुछ ही दिनों में इनका निधन हो गया। इनके विरह में दुखी चित्रसेन ने सूरत में निर्वाण साहब के आश्रम में आकर निवास किया था। कुछ वर्ष पश्चात् भ्रमण करते हुए ये जेसलमेर गये थे। वहाँ भट्टी वंश के किसी राजपूत के घर में तृष्णावती के रूप में उनको अपनी प्रियतमा के दर्शन हुए। दोनों ने एक दूसरे को पहचान लिया। विवाह के कुछ वर्ष बाद दोनों संसार से विरक्त हो गये और सूरत के निर्वाण साहब के आश्रम में आकर रहने लगे। चित्रसेन तृष्णावती को छोड़कर तीर्थयात्रा को चले गये।

तृष्णावती अत्यंत सुन्दर थी। सूरत का तत्कालीन सूबेदार दस्तरखान और एक योगी भावलनाथ उनके सौन्दर्य से मोहित हुए थे, किन्तु महाप्रतापी सन्त निर्वाणसाहब के प्रभाव से इनकी रक्षा सम्भव हुई थी। निर्वाण-साहब के सत्संग से उन्होंने पद–रचना की थी। उन्होंने अपनी वाणी में इसका उल्लेख भी किया है।

"आली ! मेरे भाग्य का, कैसे करूं बखान।
शब्द साहब निर्वाण का, मैं हो गई सुजान ॥"

उनके अनेक पदों में से एक यहाँ उधृत किया गया है।

पद

"नाथ ! मोहे तुम्ही हो खेवनहार ..... ॥ टेक ॥
भव औगाह भयावन भारीं, कौन उबारनहार ॥ १ ॥
तुम बिन मेरा कौन खेवैया, नैया डूबे मंझधार ॥ २ ॥
गर्भ–बसेरा कोल कियीरी, कैसे भूलूँ किरतार ॥ ३ ॥
दमकी दोर नटनागर नाचे, सोही तेरो रणकार ॥ ४ ॥
'तृष्णा' हरिचरण में आयी, तुम्ही हो प्राणाधार ॥ ५ ॥"

हुरा : (वि. सं. १५५०–१६२०)

ये पाटण के मुस्लिम सूबेदार की पुत्री थीं। सूबेदार का एक हिन्दू सिपाही बंकाजी अत्यन्त सुन्दर था। हुरा को उनसे प्रेम हो गया था। निमकहलाल सिपाही इनके अधीन नहीं हुआ और साधु के वेश में नगर छोड़ भाग निकला। इसका पता चलने पर हुरा भी उसकी खोज में निकल पड़ी। साधुओं द्वारा उनको समाचार मिल

गया कि बंकाजी सूरत के बाबा लोचनदास के आश्रम में सन्त समर्थदास के रूप में निवास करते हैं। समाचार मिलते ही हुरादेवी सूरत आकर बंकाजी से मिली। इस प्रसंग का उल्लेख माधवदास ने निम्नांकित शब्दों में किया है।

"बंका तेरे इश्क में, लियो जोगन को वेश।
प्यारी तेरे दीदार को, दर दर फिरे दरवेश॥
खोजत खोजत आयरी, पियरा तिहारे देश।
हुरा विरहन को मिले, पियरा अवधु वेश॥"

सन्त माधवदास सन्त समर्थदास के शिष्य थे। उन्होंने हुरादेवी का मूल चरित्र लिखा था। सन्त समर्थदास के उपदेश से हुरां ने नर्मदा तट पर जाकर एकांत में कुटिया बनवाकर निवास किया और अपना शेष जीवन हरि स्मरण में व्यतीत करने लगी। वि. सं. १६२० में समर्थदास ने जीवन्त समाधि ले ली। इसका समाचार पाते ही हुरा ने भी देह त्याग दिया। चरित्र के अन्त में माधवदास ने इसका उल्लेख किया है।

"हुरा बड़ो सुभागिनी, हरि से लगाई प्रीत।
माधव सद्गुरु संग में, चल गई भवजलजीत॥"

हुरा का समय सन्त समर्थदास के समय के आधार पर निश्चित किया जा सकता है। सन्त समर्थदास का समय वि. सं. १५५०–१६२० है। निश्चित तिथियों के अभाव में यही समय हुरा के लिये मानना चाहिये। हुरा ने अनेक पदों की रचना की है। उनके पदों की भाषा पर उनकी भाषा का प्रभाव दृष्टिगोचर हुए बिना नहीं रहता। इनके पदों में से निम्नांकित पद में हिन्दू–मुस्लिम–अभेद भाव के दर्शन होते हैं।

"सांई ! तेरा कैसे लहुरी पार ..... ॥ टेक॥
कृष्ण–करिमा, रामरहीमा, तेरे नाम हजार॥ १॥
हज-तीरथ बाबा में खोजे, काशी और हरद्वार॥ २॥
कोई पूरब, पश्चिम बतावे, चहुँदिश तेरा दीदार॥ ३॥
जाकों सांइयाँ सब घट देखा, ताको जाऊँ बलिहार॥ ४॥
'हुरा' को मंझधार में पाया, साहिब खेवनहार॥ ५॥

मदलेखा : (वि. सं. १६१२-१६८०)

ये सूरत के निकट कामरेज के राजा तानसेन की दरबारी गायिका थी। ख्वाजा देहदार साहब के प्रभाव में आकर राजा तानसेन ने इस्लाम अंगीकार किया था। उन्होंने अपनी रानियों को भी धर्म–परिवर्तन का आदेश दे दिया। इसके विरोध में एकमात्र राजकुमारी क्षमावती गृहत्याग कर स्वामी तेजानन्द के आश्रम में खरवासा चली गई। धर्म–परिवर्तन के डर से मदलेखा भी वहाँ चली गई। आश्रम में ये गौशाला की सफाई करती थी। स्वामीजी के प्रभाव से ये पदरचना करने लगी थीं। अपने पद ये मधुर कण्ठ से गाती भी थीं। उनके जन्म तथा मृत्यु की

निश्चित तिथियाँ प्राप्त नहीं होतीं। सन्त तेजानन्दजी के आगमन तथा निधन के वर्ष–सम्वत् १६१२–१६८० प्राप्त हैं। इनका मूल चरित्र दुलाराम (वि. सं. १८३०–१८७०) ने लिखा था। इनकी वाणी का एक पद निम्नांकित है।

पद

"आली ! मेरो यौवन रंग विलायो..... ॥ टेक ॥
मद घेली हुई मोह निशा में, निशदिन पाप कमायो ॥ १ ॥
गोरे बदन अरु रूप गुमानी, विषयाविष छवायो ॥ २ ॥
अभागिन के अन्धे नैन में, पियरा नहीं दरशायो ॥ ३ ॥
उड़ गई लाली आय बुढ़ापा, कण्ठ में कफ उभरायो ॥ ४ ॥
"मदलेखा" अब को नहीं तेरा, काहु से कर ही सगायो ॥ ५ ॥

चन्द्रावती :

ये धरमपुर के राजा जयदेव के वंश में पैदा हुई थीं। उन्हें अपना पूर्व जन्म याद था। अपने पूर्व जन्म के पति की प्राप्ति हुए बिना अन्य किसी से विवाह करने का इन्कार उन्होंने अपने मातापिता से कर दिया था। उनके सौन्दर्य की प्रशस्ति सुनकर सूरत का मुस्लिम सूबेदार उनसे शादी करना चाहता था; इसलिये गृह त्याग कर गुप्त वेश धारण कर ये भाग निकलीं। स्वामी तेजानन्दजी की सूचना से ये सिद्धपुर गईं। वहां मेले में उनके पूर्व-जन्म का पति उन्हें मिला। बड़ी धामधूम से उनका विवाह कटोसण के राजकुमार के साथ सम्पन्न हुआ। कुछ वर्ष पश्चात् सन्त माधवदासजी के उपदेश से दोनों पतिपत्नी संसार से विरक्त हो गये और सूरतमें उनके आश्रम में निवास करने लगे। कुछ समय बाद बंकाजी ने चन्द्रावती को खरवासा सन्त तेजानन्द स्वामी के आश्रम में भेज दिया और स्वयं माधवदासजी के आश्रम में रहने लगे। चन्द्रावती अत्यंन्त सुन्दर थीं। सूरत के सूबेदार जूल्फीकार अलीखान और एक मेषधारी साधु उनके ऊपर आसक्त हुए थे, किन्तु स्वामी तेजानन्द के प्रभाव से उनकी रक्षा हुई थी। अपने रूप को अपनी उपासना में बाधा समझकर चन्द्रावती ने योग की कठोर साधना करके शरीर को कृश कर लिया। एकबार उनको समाचार मिला कि बंकाजी समाधि लेनेवाले हैं। ये सन्त माधवदासजी के आश्रम में गईं और दोनों पति–पत्नी ने एक साथ जीवन्त समाधि ले ली। बंकाजी के गुरुबन्धु सन्त प्यारेदासजी ने बंकाजी और चन्द्रावती की मूल चरित्र–कथा लिखी थी।

चन्द्रावती ने अनेक पदों की रचना की थी। बंकाजी भी 'बंकादास' के नाम से पद–रचना करते थे। एक बार बड़ी लम्बी अवधि तक ये चन्द्रावती की खोज–खबर ले न सके। उन्होंने अपने दुःख और प्रेम की वाणी देता हुआ एक पद लिखकर भेजा। इस पत्र का चन्द्रावती द्वारा दिया गया (पद में लिखा) प्रत्युत्तर निम्नांकित है।

"पंथी मोरे पिवजी से खत पहुँचाय, मोरे श्याम रहो सुखदाय .....॥ टेक ॥
सन्त चरण लवलीन रहियो, हरि से लगन लगाय ।
वेमूल अवसर पायके प्यारे, मत गफ़लत में रहाय ॥१॥
हम बासी थे प्रेमनगर के, मिजमाना यहाँ आय ।
यह दुनिया है, हाट हरि का, सौदा कीजै सवाय ॥ २ ॥
जन्म जन्म हम संग संघाथी, बिछरे आन मिलाय ।
पियरा यह तो प्रेमनगर है, बहुरि गये छलाय ॥ ३ ॥
प्रेम गलिन में आय के प्यारे, अब मत नैन बहाय ।
शिशदेवे सोई मरजीवा, प्रेमरंग को बढ़ाय ॥ ४ ॥
जीत चलो यह प्रेम की बाजी, जीवन सफल कराय ।
'चन्द्रावती' पियुजी के चरण में, बेर बेर बलि जाय ॥ ५ ॥

कृष्ण सखी : (सत्रहवीं शताब्दी)

ये उत्तर गुजरात के बड़नगर के किसी नागर कुल में जन्मी थी। उनके ऊपर एक वैष्णव भक्त गोपालदास का प्रभाव पड़ा था। सूरत के एक नागर युवक जुगलदास से उनका विवाह हुआ था। पति के गृहत्याग करने पर ये भी अपने ननिहाल पाटण चली गईं। वहाँ से यात्रियों के साथ व्रज गईं। व्रज में उनको घर लौट आने का पति का निमन्त्रण मिला, किन्तु उन्होंने अपना जीवन श्री हरि को समर्पित कर दिया था। व्रजभूमि में उन्होंने देहत्याग किया। उनके पदों का 'गुटका' यात्री अपने साथ सूरत ले आये थे। एक पद निम्नांकित है।

पद

"आली ! मोहे मनमोहन पाया.....॥ टेक ॥
जित देखूं तित सांवरी सूरत, दूजा नहीं दरशाया ॥ १ ॥
नैन सैन में नाचत मोहन, गोविन्द नाम गाया ॥ २ ॥
सब घट तेरी सुरतिया देखो, कौन लिखे सांया ॥ ३ ॥
निराकार तूही सर्व प्रकाशी, वेद पुरान गाया ॥ ४ ॥
'कृष्ण सखी' को प्रेम बढ़ावन, पियरा प्रगट आया ॥ ५ ॥

भीमा :

भीमा का चरित्र मूल दुलाराम ने लिखा था। सूरत के कायस्थ शेठ नरहरिदास की ये पुत्री थी। सूरत के वैष्णव भक्त, मोतीराम का प्रभाव उन पर पड़ा था। 'दो सौ बावन वैष्णवों की कथा' में दो सो चौतींसवीं कथा इसी मोतीरामजी की है। उनका विवाह सिद्धपुर के शेठ जमनादास के पुत्र गोविन्द से हुआ था। सिद्धपुर के वैष्णव भक्त राणा व्यास के घर भजन कीर्तन के लिए ये जाती थी। उनके चारित्र्य पर उनके दुर्व्यसनी पति ने शंका की, तब उन्होंने तप्त लोहे को छूकर परीक्षा दी। सूरत के सूबेदार इनायतखान भी उनके ऊपर आसक्त

हुआ था किन्तु उनकी भक्ति के आगे झुक गया। सूरत और सिद्धपुर में लोग उनका आदर करते थे। उन्होंने सिद्धपुर में देहत्याग किया था। उन्होंने जो कुण्डलियाँ लिखी थीं, उनमें से एक निम्नांकित है।

कुण्डली

"पूरब जन्म को प्रोत से प्रेमे मिले भवनाथ।
विरहिन रोवत देख के, सैया ग्रहोरी हाथ।
सैया ग्रहोरी हाथ, अपनो पत निभाई।
आवागमन नहीं मोर, सजनी मंगल गाई।
भाग्य बड़ो "भीमा" लिखे, जैहो भवजल जीत।
धन्य वैष्णव समागमा, पूरब जनम की प्रीत॥

लाजवन्तो :

उनका जन्म सूरत के एक वणिक कुल में हुआ था। वि. सं॰ १६९९ में व्रज में उनका निधन हुआ। उनके बचपन में पिता जावा चले गये थे तथा माता को घर से निकाल दिया गया था। उनको एक गानेवाली ने आश्रय दिया। लाजवन्ती को संगीत की शिक्षा दी गई। संगीत में ये इतनी प्रसिद्ध हो गईं कि सूरत का तत्कालीन सूबेदार जामकुल्ली भी उनके संगीत को सुनने आता था। उनको सूरत के एक धनो पिता के इकलौते बेटे लखेचन्द से प्रेम हो गया था, किन्तु सूबेदार जामकुल्ली ने एक दिन उनको महल में आने का निमंत्रण भेजा। परिणाम के डर से ये यात्रियों के संघ के साथ भाग निकलीं। व्रज में उनका मन कृष्ण की भक्ति में लग गया।

कवि दुलाराम ने उनका चरित्र 'सन्त चरित्र प्रकाश' में लिखा है। व्रजभूमि में भ्रमण करके अन्त में उन्होंने 'सुनहरा' गाँव में एक कुटिया बनवा कर निवास किया। उनका प्रियतम लक्ष्मीचन्द उनको ढूंढता हुआ उनके पीछे यहीं आया था, किन्तु लाजबन्ती मायिक संसार को छोड़ चुकी थीं। उन्होंने संसार में पुनः आने का इनकार कर दिया। लक्ष्मीचन्द इस आघात को सह न सका। उसने वहीं व्रजभूमि में अपना देहत्याग किया। लाजवन्ती पद-रचना करती थीं और स्वयं अपने सुमधुर कण्ठ से इसे गाती थीं। 'सुनहरा की साध्वी' के नाम से वहाँ वे प्रसिद्ध हो गई थीं। उन्होंने अनेक पद लिखे हैं। इनमें से एक निम्नांकित है।

पद

"नाथ मोहे डूबत लीजै उबार.....॥ टेक॥
कृपासिंधु केशव अघहारी, तुम हो खेवनहार॥ १॥
विकट भव औगाह बिहानी, नैया बहे मँझधार॥ २॥
जात बरन कुल पिव नहीं पेखा, तारी गनिका नार॥ ३॥
लाजवन्ती [illegible] प्रीतम लीजै उबार॥ ४॥

अनिसा : (वि. सं. १७०४–१७५६)

वि. सं. १७११ (इ. स. १६५५) में सूरत के सूबेदार के रूप में दिल्ही से रोशन ज़मीर को भेजा गया था। उनके साथ उनकी सात वर्ष की बेटी अनिसा भी दिल्ही से आयी थी। नवाब के महल में सूबेदार ने निवास किया था। इसके निकट में सन्त निर्वाण साहब का स्थान था। उस समय सन्त नरहरिदास (संवत् १७२१–१७५६) गद्दी के महन्त थे। सूबेदार की छोटी बालिका अनिसा आश्रम में मन्दिर के आंगन में खेला करती थी। उसे सन्त नरहरिदास, मन्दिर और आश्रम से एक लगाव हो गया था। रोशन ज़मीर को जब दिल्ही लौटना पड़ा, तब अनिसा को बहुत दुःख हुआ था। आठ वर्ष बाद रोशन ज़मीर को पुनः सूरत की नियुक्ति का आज्ञा–पत्र मिला। इस समाचार से अनिसा फूली न समाती थी। सूरत आकर उसी स्वाभाविकता से ये मन्दिर और आश्रम में आने लगी, किन्तु अब ये बीस वर्ष की युवती हो चुकी थी। एक उच्च मुस्लिम परिवार की कन्या का गैर–मजहबी बुतखाने में जाना काज़ी और मौलवियों से सहा न गया। उन्होंने सूबेदार को शिकायत की। सूबेदार ने अनिसा को मना फरमा दी; किन्तु अनिसा ने इसे मानने से इनकार कर दिया। सूबेदार ने अन्त में विवश होकर अनिसा को विष दे दिया। सन्त नरहरिदास के प्रभाव से अनिसा विष के प्रभाव से मुक्त हो गई। इस के बाद अपने मातापिता से अलग एक पुराने मकान में रहने लगी। उस मकान से उनको जो गुप्त धन मिला, उन्होंने सन्त–सेवा में खर्च कर दिया। सूबेदार जब दिल्ली लौट गये, ये उनके साथ गई नहीं। उन्होंने सन्त वाणी लिखी है। इनकी साखियों में से कुछ निम्नांकित है।

"रहमे–समंदर सांइया, बडे गरीब–नवाज।
जलती जहाँ के बीच में, 'अनिसा' की रखे लाज॥
'अनिसा' को पहचानिया, बहुनामी तूही एक।
हिन्दू कहाँ, इस्लाम कहाँ, साहिब सबका एक॥
'अनिसा' रब्ब पिछानिया, पाया जिक्र का जाम।
नरहरि मुरशिद पीर को, मेरा लाखो सलाम॥"

संदर्भ ग्रन्थ तथा पत्रिकाएँ

१.	'गुजरात की हिन्दी सेवा' – का. ना. पत्रिका वि. सं. २०१५ अंक २		डॉ. अम्बाशंकर नागर
२.	हिन्दी साहित्य को गुजरात के सन्त कवियों की देन—		डॉ. रामकुमार गुप्त
३.	राजस्थान एवं गुजरात के सन्त एवं भक्त कवि	—	डॉ. मदनकुमार जानी
४.	'सन्त निर्वाण साहेब'	—	श्री माणेकलाल राणा
५.	सन्त तेजानन्द स्वामी	—	श्री माणेकलाल राणा
६.	बाबा दीनदरवेश	—	श्री माणेकलाल राणा
७.	गुजराती साहित्य ना मार्ग सूचक स्तम्भो	—	श्री कृष्णलाल झवेरी
८.	"निजानन्द" पत्रिका भावनगर	—	अगस्त १९७०
९.	"धर्म संदेश" ,, अहमदाबाद	—	अप्रैल १९७३
१०.	"वेणुधर" ,, ,,	—	अक्टूबर १९६३
११.	,, ,, ,,	—	अप्रेल मे १९६४
१२.	हिन्दी साहित्य का इतिहास		आ. रामचन्द्र शुक्ल

'स्वातंत्र्योत्तर हिन्दी उपन्यास साहित्य की शिल्पविधि का विकास'

(सन् १९४७ से १९६५ ई० तक)

डा० तहसीलदार दूबे,
एम. ए., पी.-एच. डी.
ग्राम-अहिरौली
पो०-गोपालापुर
जिला-जौनपुर (उ० प्र०)

उपन्यास साहित्य की एक लोकप्रिय विधा है। वह मानव के विविध व्यापारों, तत्सम्बन्धित परिस्थितियों को काल्पनिक धरातल पर प्रस्तुत करता है। उपन्यासकार मानव को इन अनुभूतियों को अपनी अभिव्यक्ति के माध्यम से उपन्यास में सजाता है। जिसमें उसको अनेक प्रकार के विधियों की आवश्यकता पड़ती है। उपन्यास के निर्माण में जो भी उपकरण प्रस्तुत किये जाते हैं, वे ही उसके शिल्पविधि कहे जाते हैं। शिल्पविधि उपन्यास का आवश्यक अंग होता है।

स्वातंत्र्योत्तर हिन्दी उपन्यास साहित्य में उपन्यासकारों की दृष्टि उपन्यास को शिल्पविधि पर अधिक केन्द्रित हुई है, जिसके फलस्वरूप इस दिशा में अपेक्षया अधिक नवीनता आई है। इस युग के उपन्यासकार भाव पक्ष की अपेक्षा कला पक्ष पर अधिक बल दिये हैं। इस युग के प्रत्येक उपन्यास में पूर्व परिचित परम्पराओं, रूढ़ियों का अभाव है। इस युग का हर उपन्यास अपने में नवीनता लेकर आया है।

उपन्यास का साहित्य की अन्य विधाओं से निकट का सम्बन्ध है, क्योंकि इसका अंग प्रायः सभी विधाओं में प्रत्यक्ष अथवा परोक्ष विद्यमान रहता है जो कि उपन्यास का मुख्य अंग होता है। प्रबन्ध काव्य, मुक्तक काव्य' नाटक, कहानी आदि सभी विधाओं में उपन्यास का तत्त्व (कथांश) समाहित रहता है।

शिल्पविधिके निर्माण के उपकरण ही उसके तत्त्व कहे जाते हैं। कथानक, कथोपकथन, पात्र, एवं चरित्र-चित्रण देशकाल, शैली एवं उद्देश्य ये ही शिल्पविधि के तत्त्व कहलाते हैं। स्वातंत्र्योत्तर युगीन उपन्यासों की शिल्पविधि का सही रूप हम तभी समझ सकते हैं, जब कि स्वातंत्र्य पूर्व उपन्यासों की शिल्पविधि का अध्ययन करें। स्वातंत्र्य पूर्व उपन्यासोंको तीन भागों में बाँटा गया है।

१. पूर्व प्रेमचन्द्र युग २. प्रेमचन्द्र युग ३. प्रेमचन्द्रोत्तर युग। पूर्व प्रेमचन्द्र युग में १९१६ ई० तक के उपन्यास आते हैं। इसमें शिल्पविधि का आरम्भिक रूप मिलता है। इसमें कथानक केवल सामान्य कथा के रूप में दिखाई पड़ता है। शिल्प के अन्य तत्त्व भी इस युग में अपना रूप धारण कर लिए। प्रेमचन्द्र युग में १९३६ ई० तक

के उपन्यास आते हैं। इस युग में शिल्पविधि का अधिक विकास हुआ है। इस युग में प्रत्येक उपन्यास प्रायः एक ही रूप में दिखाई पड़ता है। १९३६ से १९४७ ई० तक के उपन्यास प्रेमचन्द्रोत्तर युग में आते हैं। इसमें पूर्ववर्ती उपन्यासों की अपेक्षा शिल्प के क्षेत्र में नवीनता आई। शिल्प परिवर्तन ही इस युग को मुख्य देन है। व्यक्तिवादी चरित्र प्रधान उपन्यासों का उदय एवं विकास इसी युग की देन है। समाज की समस्याओं के स्थान पर व्यक्ति की मानसिक समस्याओं का प्राधान्य रहा है।

स्वातंत्र्योत्तर हिन्दी उपन्यास शिल्प की दृष्टि से विशेष महत्त्वपूर्ण है। इस युग का उपन्यासकार नित्य अभिनव शिल्प के चक्कर में जूझ रहा है। इस युग में शिल्प के प्रायः सभी तत्त्व परिवर्तित दशा में आते हैं। पाश्चात्य शिल्प का भी बहुत अधिक प्रभाव दिखाई पड़ता है। पत्रात्मक शैली, डायरी शैली, चित्रात्मक शैली एवं चेतना प्रवाह आदि शैलियों का प्रयोग अधिकाधिक रूप में हुआ है। वर्णनात्मक शैली का प्रभाव इनके सामने धुँधला पड़ गया है। उपन्यास के कथामुख भाग में लेखक में भ्रम पैदा करके शिल्प के क्षेत्र में एक कड़ी और जोड़ दी गई है। आंचलिक उपन्यासों का आगमन इस युग की बहुत बड़ी विशेषता है। उपन्यास के कथानक को सीमा बद्ध करने का प्रयत्न किया गया है।

उपन्यास आधुनिक युग की आम जनता की सशक्त वाणी है। उपन्यासों के बाहुल्य को ध्यान में रखकर इसको वर्गीकृत करना परमावश्यक हो जाता है, किन्तु शिल्पविधि की दृष्टि से वर्गीकरण एक कठिन कार्य है। मैंने स्वातंत्र्योत्तर युगोन उपन्यासों का शिल्पविधि की दृष्टि से निम्नलिखित वर्गीकरण किया है।

१. कथानक प्रधान, २. चरित्र प्रधान, ३. देश प्रधान, ४. देशकाल प्रधान, ५. शैली प्रधान, ६. उद्देश्य प्रधान ७. अभिनव शिल्प प्रधान। इन्हीं तत्त्वों के आधार पर आलोच्य युगीन उपन्यासों का अध्ययन किया गया है। यों तो इस युग में बहुत प्रकार के उपन्यास लिखे गये हैं, किन्तु मुख्य मुख्य उपन्यासों के माध्यम से उनकी शिल्पविधि का अध्ययन हो सकता है।

कथानक शिल्प प्रधान उपन्यासों के अन्तर्गत 'भूले विसरे चित्र' कब तक पुकारूं: 'झूठा सच', 'यथार्थ से आगे' तथा 'यह पथ बन्धु' था, आदि हैं। इनमें कथानक अपेक्षाकृत अधिक आकर्षक, गम्भीर तथा मानव जीवन के निकट है। पूर्ववर्ती उपन्यासों की शिल्पविधि की अपेक्षा इसको अधिकाधिक एवं प्रारम्भिक कथाओं तथा अन्य तत्त्वों के सम्बन्ध पर विशेष ध्यान दिया गया है।

चरित्र-चित्रण शिल्प उपन्यास का प्राण होता है। इस युग में चरित्र-चित्रण का विकास पात्र के चेतन, अर्ध चेतन तथा अवचेतन से लेकर उसके आचार-विचार, क्रिया-कलाप, तथा मानसिक भाव आदि के रूप में हुआ है। चरित्र चित्रण प्रधान उपन्यास इस युग की देन है। चरित्र चित्रण शिल्प प्रधान उपन्यासों में 'जिप्सी (त्याग का भाग), 'पचपन [illegible] सात मुख्य हैं।

देश प्रधान उपन्यासों के अन्तर्गत 'बहती गंगा', 'परती परिकथा तथा दुःच मोचन आदि आते हैं। शिल्प विधि के क्षेत्र में इस युग की सबसे महत्त्वपूर्ण उपज आंचलिक उपन्यासों के रूप में हुई है। आंचलिक उपन्यासों के कथानक लघु एवं दीर्घाकार दोनों रूपों में हैं। इसमें पात्रों के साथ ही अंचल विशेष का भी चरित्र-चित्रण होता है।

देश काल प्रधान उपन्यासों के अन्तर्गत 'मृगनयनी', 'जययौधेय', सुहाग के नूपुर', 'चारु चन्द्रलेख', एवं सह्याद्रि की चट्टानें' अति हैं। पूर्ववर्ती उपन्यासों की अपेक्षा इनमें ऐतिहासिकता के साथ ही अन्य तत्त्वों का पर्याप्त विकास हुआ है।

शैली शिल्प प्रधान उपन्यासों में शिल्प विशेष को ध्यान में रखा गया है। इस कोटि में वे ही उपन्यास आते हैं जो सभी तत्त्वों के रहते हुए भी अपना अलग शैली वैशिष्ट्य रखते हैं। 'सूरज का सातवाँ घोड़ा' 'अंधेरे बन्द कमरे', 'अजय की डायरी', 'काठ का उल्लू और कबूतर', 'चाँदनी के खण्डहर' तथा 'जय-वर्धन आदि शैली शिल्प प्रधान उपान्यासो की कोटि में आते हैं।

यों तो उद्देश्य प्रधान उपन्यास प्राय सभी होते हैं, किन्तु स्वातंत्र्योत्तर युग में उसका विकास जिस रूप में हुआ है यह शिल्पविधि के क्षेत्र में एक दिशा प्रदान करता है। उद्देश्य एक केन्द्र बिन्दु होता है, इसके चारों तरफ अन्य तत्व घूमते हैं। 'बया का घोंसला' और 'साप' इसका एक अद्भुत उदाहरण है।

स्वातंत्र्योत्तर युग से ही शिल्पविधि के क्षेत्र में एक विद्रोह उत्पन्न होता है। इस युग में हिन्दी उपन्यास को शिल्पविधि की दशा दिन प्रतिदिन बदलती हो जा रही है। यही कारण है कि एक हो शिल्प के अनेक उपन्यास नहीं दिखाई पड़ते। मुझे तो ऐसा लतगा है कि जितने उपन्यास हैं उतनी हो प्रकार के शिल्पविधि के प्रयोग हुये हैं। सन् १९६५ ई० के पश्चात हिन्दी उपन्यासों का आतंक कम नहीं हुआ अपितु शिल्पविधि की दिशा में अभिनव प्रयोग हुए हैं। उपन्यासों की शिल्पविधि के भविष्य में कहा जा सकता है कि शिल्पविधि का भविष्य उज्ज्वल है। शिल्पविधि के इतिहास को देखते हुए यह धारणा गलत नहीं हो सकती। हिन्दी उपन्यास साहित्य में शिल्पविधि का नूतन प्रयोग सर्वदा रहेगा।

23

सूर के शृंगार-वर्णन का रसास्वाद

—प्रा. सुभद्रा नित्यानन्द पटेल
गार्डा कॉलेज, नवसारी

"सूर-कवित सुनि कौन कवि, जो नहिं सिर चालन करै"

—भक्तमाल

(१)

कविवर सूरदास (१४७८-१५६० ई. के आसपास) की कविता, विनय, वात्सल्य तथा शृंगार की पवित्र त्रिवेणी है। भर जवानी में ही घरबार छोड़कर, वे मथुरा और वृन्दावन के बीच गऊघाट स्थान पर आ बसे थे, और कृष्ण भगवान की भक्ति के भजन गाकर श्रोतृवृन्द को मुग्ध किया करते थे। जब दिग्विजयी महाप्रभु (सब पण्डितों को जीतकर, भक्तिमार्ग की स्थापना करनेवाले) सन् १५१० के आसपास उधर पधारे, तो सूरदास उनसे मिले। महाप्रभु का आदेश पाकर सूर ने निम्न दो भजन तन्मयता से गाये--

(१) प्रभु हौं सब पतितन को टीकौ।
और पतित सब चारि दिनन के, हौं तो जनमत हीं कौ॥

* * * * * * *

(२) हरि हौं सब पतितन को नायक।
को करि सकै बराबरि मेरी, और नहीं कोउ लायक॥

श्री वल्लभाचार्य का मार्ग-दर्शन :—

इन भजनों द्वारा, सूरदास की काव्य-प्रतिभा और भक्ति-विह्वलता से प्रभावित होकर, महाप्रभु ने प्रेमपूर्वक कहा—

"सूर है के ऐसो घिघियात काहे को है, कछु भगवत् लीला वर्णन करि।" फिर तो महाप्रभु ने, सूरदास को भगवत् लीला का मर्म समझाया, पुष्टिमार्ग में दीक्षित किया; और 'श्रीमद्भागथत' के आधार पर, कृष्ण-लीला विषयक पदों की रचना करने का आदेश दिया। महाप्रभु से नयी दृष्टि, और कविता के लिए योग्य विषय पाकर, सूरदास की काव्य-प्रतिभा को चार चाँद लग गये। घिघियाना छूट गया, आशा लहरायी, गीतों का स्वर प्रायः बदल गया। उनमें स्फूर्ति, ताजगी और रसात्मकता आ गई। निश्छल प्रेम, प्रेममूर्ति कृष्ण के लीलागानों में, अजस्र धारा में फूट पड़ा। परिणामतः 'सूर-सागर' (सूरदास का कीर्तिस्तम्भ ग्रन्थ), कृष्ण की बाललीला (वात्सल्य रस) तथा यौवन-लीला (शृंगार रस) के मधुर-मनोहर राशि-राशि पदों से लहरा उठा; और काव्य-रसिकों, भक्त-जनों तथा संगीत-प्रेमियों को, एक साथ ही आनन्द-विभोर करने की सामर्थ्य से भर गया। उपयुक्त विषय हाथ लग जाने पर, शक्ति, प्रतिभा, लोक-शास्त्र-ज्ञान आदि सब कैसी स्पृहणीय छटा के साथ खिल उठते हैं!

कमाल तो यह है कि श्री. वल्लभाचार्य से नवीन दृष्टि पाकर, सूरदास ने ही सबसे पहले, कृष्ण की बाल-लीला के पद, सैकड़ों की संख्या में लिखे; परन्तु ये पद कवित्व, भक्ति-रस तथा संगीत आदि की दृष्टि से, इतने सर्वांगपूर्ण सिद्ध हुए, कि काव्य जगत् में, आज भी, बेजोड़ बने हुए हैं। और तो और, इनके माधुर्य एवं सौन्दर्य से प्रभावित होकर, महाकवि तुलसीदास ने भी अपनी कलम आजमाई; और अपने इष्टदेव राम की बाललीलाएँ विस्तार से अंकित कीं। परन्तु इन पदों में, वह बात नहीं आ सकी। बाह्य रूप-रंग का लम्बा-चौड़ा वर्णन अवश्य हुआ है, लेकिन उनमें बालकों की अन्तः-प्रकृति (ईर्ष्या, स्पर्धा, हठ, शरारत, सरलता, भोलापन, कुतूहल आदि) का न सूक्ष्म निरीक्षण है, न बाल-सुलभ चेष्टाओं का मनोवैज्ञानिक वर्णन। अनुकरण का प्रयास झलकता है; स्वतः उद्वेलित प्रेम के अभाव के कारण, ये पद फीके से लगते हैं। अन्य कवियों की तो बात ही क्या करें?

उपर्युक्त क्षेत्र में, सूरदास की अभूतपूर्व सिद्धि का रहस्य, उनकी निर्दोष बालकों से मिलती-जुलती सरल प्रकृति में है। आचार्य हजारी प्रसाद द्विवेदी, इस रहस्य को स्पष्ट करते हुए लिखते हैं—

"बालकृष्ण की एक-एक चेष्टा के चित्रण में, कवि, कमाल की होशियारी और सूक्ष्म निरीक्षण का परिचय देता है। न उसे शब्दों की कमी होती है, न अलंकार की, न भावों की, न भाषा की। क्यों ऐसा हुआ है? इसका कारण, यशोदा का निखिलानन्दसंदोह भगवान बालकृष्ण के प्रति, एकांत आत्मसमर्पण है। अपने आपको मिटाकर, अपना सर्वस्व निछावर करके जो तन्मयता प्राप्त होती है, वही श्रीकृष्ण की बाललीला को, संसार का अद्वितीय काव्य बनाये हुए है। यशोदा को उपलक्ष्य करके, वस्तुतः सूरदास का भक्तचित्त ही शत-शत स्रोतों में उद्वेलित हो उठता है।"

"वही चित्त गोपियों, गोपालों, और सबसे बढ़कर राधिका के रूप में अभिव्यक्त हुआ है। इसीलिये सूरदास की पुनरुक्तियाँ जरा भी नहीं खटकतीं; और वाक्चातुर्य इतना उत्तम कोटि का होकर भी, व्यंग्यार्थ के सामने अत्यन्त तिरस्कृत हो गया है।"

स्वकीय हृदय निचोड़ा है राधा के माध्यम से—

हम यहाँ सूरदास के शृंगार वर्णन की चर्चा करने बैठे हैं। फिर भी आचार्य द्विवेदी का उपर्युक्त विस्तृत अवतरण, इस चर्चा से पूर्व, भूमिका के रूप में उद्धृत करना इसलिये आवश्यक समझा है, कि जो बात सूरदास के बाललीला के पदों पर लागू होती है, वही बात यौवनलीला (शृंगार) के पदों पर भी, शत-प्रतिशत लागू होती है। इन पदों में गोप-गोपियों और मुख्यत: राधिकारानी के माध्यम से, भक्तचित्त ही उद्वेलित हुआ है। बाललीला के पदों में, जो सीमातीत प्रेम प्रस्फुटित हुआ है, यौवनलीला के पदों में, आलम्बन भेद से उसी निश्छल-निःसीम प्रेम का रूपान्तर मात्र हुआ है। इसलिए यौवनलीला के पदों में, एकमात्र लौकिक प्रेम का चित्रण देखना -दिखाना, उथली दृष्टि का द्योतक है। आचार्य द्विवेदी के निम्न शब्दों पर ध्यान देने से ही, सूरदास के शृंगारिक पदों के सौन्दर्य का सही मूल्यांकन हो सकता है :-

'राधा और कृष्ण के नाम पर प्रेम काव्य अनेक लिखे गये हैं। रीति काल का तो प्राय: समूचा साहित्य ही, इस प्रेमलीला का विस्तार है। पर राधाकृष्ण का नाम ले लेने मात्र से, कविता उस श्रेणी की नहीं हो जाती, जहाँ भक्त, राधा और अन्य गोपियों के बहाने, अपने आपको दलित द्राक्षा के समान निचोड़कर, सर्वात्मना, भगवान् के चरणों में निछावर कर देता है। वहाँ भावों और हावों के सूक्ष्म भेद भूल जाते हैं। वैष्णव भक्त, भगवान् के साक्षात् विग्रह रूप का, लीला-गान करते हैं, और गोपियों के बहाने, अपना प्रीति-निवेदन करते हैं।''

इस प्रकार के प्रीति-निवेदन को, भगवान के प्रति अनन्य, अखण्ड, एकरस, प्रेम को (श्री वल्लभाचार्य के शब्दों में माहात्म्य ज्ञान पूर्वक भगवान् के प्रति सुदृढ़, सर्वाधिक और सतत स्नेह को, 'माहात्म्यज्ञानपूर्वस्तु सुदृढ़: सर्वतोऽधिक: स्नेहोभक्तिरिति प्रोक्त:'), भक्ति कहते हैं। यह प्रीति-निवेदन दासरूप में, सखारूप में, जननीरूप में और कान्तारूप में किया जा सकता है। सूरदास का मन कान्ताभाव से प्रीति-निवेदन में, विशेष रूप से रमा है। कारण यही है कि प्रेम के अनेकविध सम्बन्धों में, स्त्री-पुरुष के प्रणय-प्रेम में जो सीमातीत आवेग, आकर्षण, आसक्ति, विह्वलता, तीव्रता, और एकात्मता होती है, वह अन्यत्र दुर्लभ है। इसमें न कोई दूरी रहती है, न परदा; न कोई आवरण और न दुराव-छिपाव। मेरे तेरे के सब भेदभाव मिट जाते हैं। अहं का पूर्ण विसर्जन होता है। दो आत्माएँ, एकमेव होकर घुलमिल जाती हैं। तन्मयता और तल्लीनता की पराकाष्ठा होती है। इसलिये इसकी मधुरता अपूर्व होती है, रसात्मकता सर्वातिशायी और मर्मस्पर्शिता सार्वजनीन। स्त्री-पुरुष (प्रिया-प्रियतम) के सम्बन्ध की इसी प्रगाढ़ता, व्यापकता, मधुरता और पृथक्पन को गला देने की शक्ति के कारण ही, और तो और, कबीर जैसे अक्खड़ भक्त ने भी, अपनी अखण्ड-एकरस प्रीति का निवेदन, कान्ताभाव के आश्रय द्वारा ही किया है। यथा--

"बालहा आव हमारे गेह रे, तुम बिन दुखिया देह रे।
सब कोई कहै तुम्हारी नारी, मोको इहै अन्देह रे।
एक मेक ह्वै सेज न सोवै, तब लगि कैसा नेह रे॥"

इस प्रकार के प्रेम-निवेदन को 'काव्यशास्त्र' के पण्डित, शृंगार रस की संज्ञा देते हैं, क्योंकि इसमें प्रेम के बाह्य रूप, भेद-उपभेद, भाव-विभाव, हाव-अनुभाव, सात्त्विक तथा संचारीभाव आदि सब कुछ वैसा ही होता है, जैसा लौकिक शृंगार में। परन्तु चैतन्य महाप्रभु के भक्त-प्रवर रूप गोस्वामी ने 'उज्ज्वल नीलमणि' ग्रन्थ में, लौकिक शृंगार से भिन्नता बताने के लिये, उपर्युक्त प्रेम-निवेदन को उज्ज्वल-रस, मधुर-रस, (माधुर्य) या भक्तिरस (मधुराख्यो भक्तिरसः) कहा है। लेकिन शृंगार में तथा माधुर्य में मुख्य भेद यही है कि लौकिक शृंगार का आलम्बन जहाँ साधारण नायक होता है, वहाँ मधुर रस का आलम्बन, प्रायः देवाधिदेव या अवतारी पुरुष होता है। 'काव्यशास्त्र' के अनुसार देवादि विषयक रति को, केवल भाव कहते हैं, रस नहीं। परन्तु 'उज्ज्वल नील-मणि' ग्रन्थ के अनुसार यह माधुर्य या भक्ति रस है, जो सब रसों का राजा है। आलम्बन का भेद ही वस्तुतः सब कुछ है, जो एक प्रकार की रति को शृंगार, तथा दूसरे प्रकार की रति को माधुर्य का रूप देता है। इस तथ्य को दृष्टि में रखने पर ही, सूर के शृंगार के व्यंग्यार्थ या रमणीयता को बराबर समझा जा सकता है। नहीं तो, सूर के रसीले पदों में जहाँ-तहाँ अनौचित्य, अश्लीलता, अनैतिकता, विलास आदि अनेक दोष ढूँढे जा सकते हैं; और विवेचक, राधा-कृष्ण के उक्त प्रेम को हीन कोटि का कहकर नाक भौं भी सिकोड़ सकते हैं। ग़लतफ़हमी विवादों और अनर्थों का बड़ा मूल है।

सचाई यही है कि सूरदास भक्त पहले थे और कवि पीछे। वह तो भक्ति को लोकभोग्य बनाना चाहते थे। इसीलिये उसे रसात्मक रूप देने के लिये, उन्होंने लौकिक शृंगार का आवरण स्वीकार किया है; क्योंकि वह रसों का राजा है, सार्वभौम और सार्वजनीन आकर्षण रखता है। इस आकर्षण से सूखी बात सुहावनी हो गई! अथवा यों कहिये कि सोने में सुगन्ध आ गई!! भाव में और कला में परस्पर स्पर्धा होने लगी!!! इसीलिये ये पद पुराने पड़ने का नाम ही नहीं लेते; जितनी बार पढ़िये उतनी ही बार नया-नया रस घोलते हैं; इसी को कमाल कहते हैं; उत्कृष्ट कारीगरी कहते हैं, अद्वितीयता कहते हैं। स्वच्छ-शृंगार के चित्रण में सूर का कोई सानी है, हम नहीं जानते।

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संयोग पक्ष

सूरदास का शृंगार वर्णन अपने जैसा आप ही है। कृष्ण, अपनी रूपमाधुरी से, अंग-अंग से खिलती हुई कांति से, प्रेमपूर्ण हृदय से, आत्मीयतापूर्ण सद्व्यवहार से, मीठी वाक् छटा से, विनोदभरी बालक्रीड़ा से, भलाई के कृत्यों से, हरएक के सुख दुःख में हाथ बँटाने से तथा शक्ति-सामर्थ्य के अद्भुत कृत्यों से, व्रजके- आबाल वृद्धों के प्रेम-पात्र, भाई-बंधु एवं सखा-मित्र बन गये थे। अड़ोस-पड़ोस के सब घरों में, उनका बेरोक टोक प्रवेश था। जहाँ पहुँच जाते थे, वहाँ क्रीड़ा-कल्लोल और आनन्दोल्लास छा जाता था। यह सब लम्बी चौड़ी कहानी (गोप-गोपियों के साथ प्रेम-प्यार की) न छेड़कर, हम सिर्फ कृष्ण और राधा के प्रेम-प्यार की थोड़ी चर्चा करेंगे।

प्रेमोदय

सबसे पहले तो यही कहना है, कि राधा को परकीया नारी कहकर, सूर के शृंगार-वर्णन में जहाँ-तहाँ अश्लीलता एवं अनैतिकता होने की, जो ऊलजलूल बातें करते हैं, उनके साथ विवाद में उतरना बेकार है। सूर की राधा विलासिनी नहीं है; वह लज्जाशील है, धैर्यवती है, विनीता है, रूपवती है, गांभीर्य शालिनी है, हँसमुखी है, विश्वास-परायणा है, अलबेली है, वस्त्राभूषण की शौकीन है। बालक-सी भोलीभाली और निर्दोष हृदया है। कृष्ण की वह बाल सहचरी है। उनके प्रथम परिचय का जो रंगीन चित्र सूर ने उतारा है, वह कितना अनूठा है—

"खेलन हरि निकसे व्रज खोरी।
गये श्याम रवितनया के तट, अंग लसति चंदन की खोरी।
औचक ही देखी तहँ राधा, नैन बिसाल, भाल दिये रोरी।
सूर स्याम देखत ही रीझे, नैन नैन मिलि परी ठगौरी॥"

बालक कृष्ण और अल्प-वयस्का राधा के नैन नैनों से मिले, और एक दूसरे के अद्भुत रूप-लावण्य के कारण, जादू-सा ही हो गया। कृष्ण रीझ गये, किन्तु बिना किसी झिझक के पूछा—

"बूझत स्याम कौन तू गोरी!
तुम्हरो कहा चोरि हम लैहैं? खेलन चलो संग मिलि जोरी।
सूरदास प्रभु रसिक सिरोमनि, बातन भुरइ राधिका भोरी॥"

साथ-साथ खेलने चलने का प्रस्ताव स्वीकृत हो गया। जिसकी चाह थी, वह बिन माँगे ही मिल गया। फिर तो वे एक साथ खेलते हैं, खाते हैं, झूला झूलते हैं, घूमते-फिरते हैं, जहाँ-तहाँ मिल जाते हैं, हँसी-मजाक और क्रीड़ा कल्लोल में मशगूल रहते हैं। बाल्यकाल के हास-परिहास और छेड़-छाड़ के बढ़ते-बढ़ते, प्रेम का बीज पड़ गया। दोनों एक दूसरे का अभाव अनुभव करते हैं, मिलने-जुलने के लिये बेचैन होते हैं, इशारा करते हैं, घात लगाते हैं, कसमें खाते हैं। इस प्रकार बाल-क्रीडा, यौवन-क्रीड़ा में, ऐसे स्वाभाविक क्रम से बदल जाती है, कि संधिकाल का कुछ पता नहीं चलता। दोनों में 'लरिकाई का प्रेम' है। इस प्रेम की गाँठ ऐसी पक्की होती है, कि छुड़ाना मुश्किल ही है। प्रेम की शुरुआत कैसी मनोवैज्ञानिक और संगीतमय है?

प्रेम का विकास

कृष्ण अब राधा के घर जब तब पहुँच जाते हैं, और राधा को अपने घर अक्सर बुला लाते हैं। वहाँ मिलकर वे भाँति-भाँति के उत्पात करते हैं, और आँख-मिचौनी का आनन्द लेते हैं। यशोदा पूछती है कि क्यों री राधा! तू ऊधम मचाने बारबार यहाँ क्यों चली आती है? तब राधा, कृष्ण की सब चोरी (तुम्हरो कहा चोरि हम लैहैं) भोलेपन में कह देती है—

"मैं कहा करौं, सुतहि नहिं बरजति, घर ते मोहिं बुलावै ।
मोंसो कहत तोहिं बिनु देखे रहत न मेरो प्रान ।
छोह लगत मोकों सुनि बानी, महरि ! तिहारी आन ॥"

एक दूसरे को बिना देखे, दोनों के प्राण अब निकलने लगे। आचार्यद्वय (शुक्लजी तथा द्विवेदीजी) ठीक कहते हैं,—'यह स्वर्गीय प्रेम है, वासना से रहित, निर्मल, विशुद्ध, अपने जैसा आप, निर्बन्ध, जीवनोत्सव का दूसरा रूप ! रूपलिप्सा से अंकुरित तथा दैनंदिन साहचर्य से पल्लवित-पुष्पित। बड़ी बात तो यह है, कि यह प्रेम अन्धा नहीं है, आँखें खोलने वाला है। तन्मय बना देनेवाला ऐसा प्रेम पैदा हो जाय, तो जीवन धन्य हो जाय ! यह प्रेम सजीवता ला देता है, विनोदवृत्ति बढ़ा देता है, नयी-नयी उमंगों और लीलाओं को तरंगित करता है—

(क) "धेनु दुहत अति ही रति बाढ़ी ।
एक धार दोहनि पहुँचावत, एक धार जहँ प्यारी ठाढ़ी ।
मोहन करतें धार चलति पय, मोहनि मुख अति ही छवि बाढ़ी ॥"

(ख) "तुम पै कौन दुहावे गैया ।
इत चितवत, उत धार चलावत, यहि सिखयौ है मैया ?"

मन मन भावे मूँड हिलावै जैसी बात हुई। राधा दोहनी लिये गोष्ठ में पहुँच जाने को अकुलाती है, हँसती है, सकुचाती है; परन्तु आखिर फिर—

"जननि सों दोहनी माँगति बेगि दे री माइ ।
सूर, प्रभु खरिक मिलिहौं गये मोहिं बुलाइ ॥"

यों बातें बनाकर, कृष्ण और राधा फिर-फिर गोष्ठ में मिल जाते हैं, और अपने जी की प्यास बुझाते हैं। मस्ताते हैं, शरारत करते हैं; राधा, कृष्ण की बाँह पकड़ लेती है, और वह चोर-शिरोमणि बाँह छुड़ाने का ढोंग करते हैं। दोनों के रंग-रहस्य का यह स्मरणीय चित्र देखिये :—

"बाँह तुम्हारी नेक न छड़िहौं, महरि खिझिहैं हमको ।
मेरी बाँह छोड़ि दे राधा, कर न उपरफट बातें ।
सूर स्याम नागर नागरि सों करत प्रेम की घातें ॥"

प्रेम-जनित हर्षोल्लास, मौजमस्ती और चुहलबाजी के सैकड़ों रंगीन चित्र, सूर की तूलिका ने उतारे हैं। प्रेम की उमंगों, नये-नये अनुभावों, हावों, चेष्टाओं की निराली छटा चारों ओर छिटकायी है। मनोभावों की गति-विधि का ऐसा सूक्ष्म परिज्ञान, मनोवैज्ञानिकों को भी आश्चर्यान्वित करता है।

खेल खेल में, ब्रजराज की इधर-उधर की चालों से, राधा अपना दिल चुरवा बैठी, प्रेम की बातें वह भी सीख चली; पक्षी के समान उड़ने लगी, प्रेम-पंथ पर कदम बढ़ाने लगी। यशोदा के घर प्रेमी-युगल, आशंका के बिना, मिलने लगा; हँसी-खुशी, गप-शप, प्रेम की नयी-नयी बातों में दिन न जाने कैसे गुजर जाता था। यशोदा तो प्रेम और ममता में जानते-बूझते भी आँख मीच लेतीं थी, परन्तु राधा की माँ, देर से घर पहुंचने पर वृषभानुलली पर यों झल्ला उठती थी—

"काहे को तुम जहँ तहँ डोलति हमको अतिहि लजावति।
अपने कुल की खबर करौ द्यौं सकुच नहीं जिय आवति॥"

लेकिन, बाहरी-भीतरी सुन्दरता में अद्वितीय प्रिय के विश्वास से, प्रेम-पंथ पर जब कदम बढ़ चले, तो फिर संकोच क्या, लज्जा क्या! अद्वितीय युगल-मूर्ति का प्रेम, दिनों-दिन, गाढ़ से गाढ़तर हो गया। ऐसा निश्छल, प्रगाढ़ प्रेम, किसी बन्धन को मानता है क्या? हल्की हवा को रोका जा सकता है, किन्तु वह अन्धड़ तूफान का रूप धारण कर ले, तो क्या वह रोके रुका है?

बात जब बढ़ गई, तो बाँध बाँधने से क्या होता है? अब तो प्रेमी-युगल की मदभरी आँखें मिलने लगीं; हृदय की मधुर अभिलाषाएँ आँखें खोलने लगीं। कृष्ण के मादक इशारों से, और मनोवांच्छित प्रस्ताव से राधा-रानी शर्मा गयी। लज्जा की लाली, और रूपरानी की हल्की सी मुस्कान का निम्न चित्र, कितना प्यारा है—

"कनक बदन सुढार सुन्दरि सकुचि मुख मुसकाइ।
स्याम प्यारी नैन राचे अति विसाल चलाइ।
सूर प्रभु के वचन सुनि-सुनि रही कुँवरि लजाइ।"

हृदय में अब गुदगुदी पैदा होने लगी, मिलन की आतुरता बेहद बढ़ गई, क्षणभर का भी बियोग प्रेमी युगल को खलने लगा। कोई चारा ही नहीं रहा। राधा कृष्ण को पति रूप में पाने के लिए, देवताओं को मनाने लगी—

"सिव सों विनय करत कुमारि।
हमहिं होऊ कृपालु दिनमनि तुम विदित संसार।
काम अति तनु दहत दीजै सूर हरि भरतार।"

भोले शंकरजी, सुन्दरी की विनती सुनकर खुशी से फूल उठे। जी चाहा वरदान याचक को मिल गया। दुन्दुभी और मृदंग बज उठे और खूब धूमधाम से प्रेमी-युगल का विवाह हुआ—

"देव दुन्दुभी मृदंग बाजे वर निसान।
बारने तोरन बँधाइ हरि कीन्ह उछाह।
ब्रज की सब रीति भइ बरसानै ब्याह।"

सूर ने प्रेमोदय ही नहीं, प्रेम का विकास भी, बड़े सुन्दर एवं मनोवैज्ञानिक ढंग से किया है। प्रेम को अक्षयनिधि से, न जाने कहाँ से लाकर, भक्त कवि ने अपना दिल भर लिया था। इस दिल की उमंगों ने छलक-कर, शृंगार वर्णन को, अद्‌भुत सजीवता–सरसता से छहरा दिया है।

प्रेम की परिणति

युवक–युवती के विवाह के बाद जो कुछ होना स्वाभाविक है, उसका भी सूर ने आकर्षक वर्णन किया है। ज़बान बिल्कुल बन्द रखने से भाँति–भाँति की कुण्ठाएँ एवं विकृतियाँ उत्पन्न होती हैं, इस तथ्य को सूरदास समझते थे। काम–भावना मानव हृदय की सबसे प्रबल भावना है। इस भावना को मर्यादित रूप में तृप्ति मिले, तो जीवन सुन्दर और सार्थक बन जाता है। इसलिये वासना–विकार को पोषण न मिले, इस ढंग से काम–भावना को औचित्य के साथ, तृप्त करने का कठिन कार्य कवि को करना होता है। इस कठिन कार्य को जो कर दिखाते हैं, वे ही सिद्ध कवि हैं। जैव धरातल पर जन्म लेकर जो कविता, उत्तरोत्तर आत्मा के धरातल की ओर उठती चले, वही प्रथम कोटि की कहलाती है। सूर की कविता इसी कोटि की है।

भगवान् कृष्ण ने स्वयं कहा है, "धर्माविरुद्धो भूतेषु कामोऽस्मि भरतर्षभ" (गीता ७. ११)। कृष्ण के इसी रूप को सूर ने चित्रित किया है। "नवल गुपाल नवेली राधा नये रस पागे" में, नव दम्पति के नये प्रेम–प्रणय एवं रंग–विस्तार के चित्र उभरे हैं—

(क) रीझे परसपर वर नारि।
कण्ठ भुज भुज धरे दोऊ, सकत नहिं निवारि।
गौर स्याम कपोल सुललित अधर अमृत सार।
परसपर दोऊ पिय रु प्यारी रीझि लेत उगार i
प्रान इक द्वै देह कीन्हे भक्ति–प्रीति–प्रकास।
'सूर स्वामी–स्वामिनी—मिलि करत रंग विलास।

× × × × × ×

(ख) अपनी भुजा स्याम भुज ऊपरि स्याम भुजा अपने उर धरिया।
यों लपटाई रहे उर–उर ज्यों मरकत मणि कंचन के जरिया।

रति–विस्तार के इस प्रकार के चित्रों में, सूर ने क्ही कहा है जो परम स्वाभाविक है, यथार्थ है। आँखों में ही विकार हो, तो उसकी तो दवा करनी हो चाहिए। खूबी तो यह है कि सूर ने इन चित्रों में, रंग खूब सँभलकर भरा है। उन्हें आवश्यकता से ज्यादा रंगीन नहीं किया है। इसलिए ये चित्र, आँखों को तृप्त करते हैं और हृदय को आप्यायित!

संयोगशृंगार के जिस चित्र को देख आदर्शवादी आलोचक, बिशेष रूप से, नाक-भौं सिकोड़ते हैं, वह निम्न है—

"नीवी ललित मही जदुराई ।
जबहिं सरोज धरयौ श्रीफल पर, तब जसुमति गई आइ ॥
ततछन रुदन करत मन—मोहन, मन में बुधि उपजाइ ।
देखौ दीठि देति नहिं माता, राख्यो गेंद चुराइ ॥
देखि बिनोद बाल-सुत कौ तब, महरि चली मुसकाइ ।
सूरदास के प्रभु की लीला को जाने इहि भाइ ॥"

इसमें नाक-भौं सिकोड़ने की गुंजाइश ही कहाँ है ? सूर ने रति-विलास के चित्र उतारने को, कलम जरूर उठाई है; परन्तु उसे बड़े संयम के साथ रोक भी लिया है । इस संयम--मर्यादा की तारीफ ही करनी चाहिए । सूर की कला पर रीझने को मन करता है । विषम समय में भी, कृष्ण की हाजिर जवाबी और वाग्विदग्धता लाजवाब है । इस कमाल पर, दर असल तो दाद देनी चाहिए ।

फिर इसे पुष्टिमार्ग के अनुसार, पूर्ण आत्म-समर्पण के फलस्वरूप, प्रभु का प्रसाद या अनुग्रह (या पुष्टि) के रूप में, क्यों नहीं देखना चाहिए ? राधारानी के जैसा सर्वस्व समर्पण हो, तो प्रभु, पुष्टि की वर्षा अवश्य करते हैं; कवि को शायद यही रसात्मक ढंग से कहना था । कवि जानता है कितना कहना चाहिए, और कहाँ कलम थाम लेनी चाहिये । सूरदास के प्रेम की परिणति भी, कितनी रसात्मक है ?

शृंगार के आलम्बन, उद्दीपन, हाव-अनुभाव, रसीले नैन, मुरली-माधुर्य, चाँदनी भरी रातों का रास-रंग आदि की सारी चर्चा, अभी तो बाकी है । परन्तु विस्तारभय से हम कलम थामते हैं । संयोग-पक्ष के उपसंहार के रूप में, हम सिर्फ इतना हीं कहना चाहते हैं, कि सूर की राधा, विद्यापति की राधा के समान विलासिनी-उन्मादिनी बिल्कुल नहीं है; और कृष्ण, भाँति-भाँति की लीला करते हुए भी, पद्मपत्र की तरह निर्लिप्त हैं । इस दृष्टि से सूरदास की चरित्र-सृष्टि अपूर्व है ।

(३)

वियोग पक्ष :—

सूर का विरह-वर्णन, संयोग-पक्ष के वर्णन से भी कहीं अधिक भाव-सबल और आकर्षक है । संयोग-पक्ष में तो केलि-कौतुक, विलास-लीला, रास-रंग, नाच-गान, छेड़-छाड़, माखन-चोरी, चीर-हरण आदि बाहरी बातों की प्रधानता रही है । यह ठीक है कि बाहरी बातों के चित्रण में, सूर ने गजब की मौलिकता दिखाई है । फिर भी, यह तो मानना ही होगा कि संयोगपक्ष में, प्रेममग्न हृदयों की अनुभूतियों का विस्तृत उद्घाटन कम ही हुआ

है। यह कमी, वियोगपक्ष के चित्रण में दूर हुई है। इससे, यह चित्रण अधिक गंभीर, मर्मस्पर्शी एवं मनोरम बन गया है।

कृष्ण :—

जिसके विरह में सारा व्रज, सुनसान और श्रीहीन हो गया है, उस प्रेम की सजीव मूर्ति कृष्ण की ही दशा, पहले देखनी चाहिये। उनके बार बार के आग्रह से, उद्धव व्रज हो आये हैं। कृष्ण उनसे गोप–गोपियों की दशा, बड़ी उत्सुकता और उत्कण्ठा से पूछते हैं। नन्द बाबा कैसे हैं, यशोदा मैया का क्या हाल है? राधा कैसी है, गोप–गोपियाँ कैसी हैं! घुमा फिराकर फिर–फिर राधा की बात पूछते हैं, और सुनते–सुनते अघाते ही नहीं। उद्धव समझ गये; मुसकुराकर बोले, इतना चाव है, दिल में इतना दर्द है, तो फिर व्रज में अपने आप क्यों नही हो आते?

"तुमहू बूझि बहुत बातन को वहाँ जाहु तौ जानौ।"

वे शरमा गये। कुछ बोल न सके; व्रजवासियों की प्यार भरी बातें सुन–सुनकर, ज़ख्म ताज़े हो गये। ज़मीन की ओर ताकने लगे, उद्धव की नज़रों से नज़र ही न मिला सकते थे। उद्धव ने पूछा,—'सखा तुम्हें आज क्या हुआ है; तुम्हारी आँखें उठती क्यों नहीं हैं?'

"मों सो बात कहत किन सनमुख कहा अवनि लेखौ।"

दर्द कहाँ तक छुपाते? प्रीति छुपाये छुपी है? प्रेम के प्रवाह में वेग के साथ बह चले। आहें और उच्छ्वास जोर से भरने लगे। अश्रुधारा बह चली—

"सूर उसास छाँडि हा हा व्रज, जल अखियाँ भरि लीनी।"

बाँध जब टूट गया, तो फिर रोक–थाम से क्या बनता है? कृष्ण आँसुओं में फूट पड़े, और उद्धव से जी का दर्द कहने लगे,—तुम मानोगे उद्धव, कि मथुरा के राजमहल में मुझे तनिक भी नहीं सुहाता;—मैं दिनरात माँ के दुलार और राधा के प्रेम–प्यार के लिये तड़पता रहता हूँ। मेरा दिल गोकुल की गलियों में ही घूमा करता है। वे गाय–बछड़े, उन्हें दोहना–बाँधना और दोहनी लानेवाली के साथ हँसना–हँसाना और छेड़–छाड़ करने की सुधि, मुझे बिह्वल बना देती है—

"ऊधो मोहिं व्रज विसरत नाहीं।
हंससुता (जमुना) की सुन्दरी कगरी अरु कुञ्जन की छाँही॥
वै सुरभि, वै बच्छ, दोहनी, खरिक दुहावन जाहीं॥
जबहिं सुरति आवति वा सुख की जिय उमगत तनु नाहीं।
अनगन भाँति करी बहु लीला जसुदा नन्द निबाहीं।
सूरदास प्रभु रहै मौन ह्वै, यह कहि कहि पछिताहीं॥"

कृष्ण के आँसुओं में, मौन में और पछताने में कितनी व्यथा-वेदना और विह्वलता छुपी हुई है? ऐसे प्रेमी जीव के—जो प्रेम-प्यार में ही जीवन व्यतीत करता था, और छोटे-बड़े सब को प्रसन्न रखने में ही आनन्द मानता था—विरह-वियोग में सारा व्रज यदि जलहीन मीन के समान तड़पता है, तो क्या आश्चर्य है?

"ज्यों जलहीन मीन-तन तलफत त्योंहि तपत व्रज बालहिं।
सूरदास प्रभु बेगि मिलावहु मोहन मदन गोपालहिं॥"

कवि ने थोड़े शब्दों में ही, बहुत कह दिया है। राजमहल के सब सुख-विलास में भी, जो दिनरात व्रज के गोप-गोपियों, गाय-बछड़ों, करील-कुंजों, और गली-कूचों की याद में, सुख की नींद सो ही नहीं सका, उसकी पीर-पीड़ा और बेचैनी को, कौन समझ सकता है? जो विवेचकवर्य कृष्ण की बेवफ़ाई या भ्रमरवृत्ति की शिकायत करते हैं, उन्हें फिर से, सहानुभूति के साथ, उपरोक्त पंक्तियों को पढ़ना चाहिये और विचारना चाहिये, कि उद्धव को व्रज भेजने में, कृष्ण का मुख्य मक़सद ही क्या था? कुछ विवेचकों की फरियाद है, कि सूर ने जिस प्रेम का चित्रण किया है, वह एकांगी या एक तरफ़ा है; और इसीलिये उसे 'काव्य-शास्त्र' की दृष्टि से, शृंगाराभास या रसाभास कहना चाहिये। एकपक्षीय प्रेम को सिद्ध करने के लिए कहा जाता है, कि 'सूरसागर' गोप-गोपियों और राधा के अश्रुओं से भरा पड़ा है, कृष्ण के अश्रु तो उसमें दो चार ही हैं; यह सत्य है। परन्तु इससे अनुराग को एकपक्षीय सिद्ध नहीं किया जा सकता। कवि, अपने समय की लोकरुचि को अच्छी प्रकार समझता था, और मानव-मन के विविध भावों का मनोवैज्ञानिक ज्ञान, पर्याप्त मात्रा में रखता था। उसे मर्यादा का भी ध्यान था, गीता के कृष्ण की अनासक्ति, अलौकिकता और निस्पृहता की भी रक्षा करनी थी। कहाँ विस्तार करना है, कहाँ संयम से काम लेना है, यह सूर की कलम खूब समझती थी। उसने कृष्ण को, विशुद्ध प्रेम की सजीव मूर्ति के रूप में चित्रित किया है, रसिक-छैला के रूप में नहीं। यही तो सूरदास की कलम की विशिष्टता है, जिसे सूर के पश्चात् आनेवाले कृष्ण-भक्त कवि, धीरे-धीरे भूलते गये; परिणामतः उनके काव्य में, भावों की उच्चता और उदात्तता (काव्य को स्थायी बनानेवाले तत्त्व) की मात्रा कम होती गई; उज्वल काव्य-दीप, जो प्रेम की ज्योति से सहस्रों हृदयों को प्रकाशित करता था, युग बदलने पर, आगे चलकर, विलासिता की कज्जल बखेरने लगा। सूर तो औचित्य और अनौचित्य की सीमा को खूब समझते थे। धार पर चलते हुए भी, जिसके कदम डगमगाये नहीं, वही तो सच्चा कवि है।

राधा :—

सूर के प्रभु की विरह-वेदना बहुत गहरी है। लेकिन राधिका-रानी की, सारी करुण-कहानी अभी तो शेष है। कृष्ण के मथुरा चलते समय, वह बेचारी ठगी सी खड़ी रह गई—

"चितवत रही ठगी सी ठाढ़ी, कहि न सकी कछु काम-दही!"

राधा लुट गई। उसका रूप-यौवन, श्री-शोभा, मस्ती-मौज, सुख-सौन्दर्य, मान-गर्व, यों कहिये, सब कुछ क्षणभर में ही बिखर गया। दिन की चाँदनी रजनी के समान वह ढल गई।

"बिनु माधव राधा तन, सजनी ! सब विपरीत भई ।
गई छपाय छपाकर की छबि, रही कलंकमयी ॥
लोचन हू तें सरद-सारसै, सुछबि निचोय लई ।"

चाँद-से मुखड़े की छवि न रही, कमल-से नेत्रों की कान्ति न रही, शरीर की स्वर्णिम आभा न रहो। इस अस्थि-कंकाल का आँखों-देखा चित्र, उद्धव कृष्ण के सम्मुख यों चित्रित करते हैं—

"हरि तिहारे विरह राधे मैं जो देखी छीन ।
कहन को सन्देस सुन्दरि गवन मो तन कीन ॥
छुटी छुद्रावली चरन अरुझे गिरी बलहीन !
नैन जल भरि रोइ दीनी, ग्रसित आपद दीन ।
सूर हरि के चरन अम्बुज रही आसालीन ॥"

कैसी करुण दशा ! कम्पित काया, धड़कता हृदय, अंगों में स्फूर्ति नहीं, अधरों पर हँसो नहीं। बिखरे केश, फटी हुई कंचुकी। दो कदम चल भी न सकी, उलझकर गिर पड़ी। आपद-ग्रस्त, लाचार, फिर भी मिलन की रही सही आशा लिए हुए। आहें-उच्छ्वासें भरतो हुई; ज्यों-त्यों जोवन का उपक्रम करती हुई। विधि की कैसी वक्रता ! जो कोयल सी कुहुकती थी, तितली सी उड़ती फिरती थी; विकसित पुष्प-सी जो बरसाने को रूप-सौरभ से भर देती थी; उसकी यह दीन दशा। पत्थर दिल भी पिघल सकता है। इस करुण-कथा को सुन, कृष्ण फूट-फूट कर रो पड़े, तो आश्चर्य ही क्या है ? वे तो प्रेम-दीवाने थे, फूल से भी कोमल दिल लिये।

जो शृंगार की शौखीन थी, सलमों-सितारों से लदे लहँगे, और रत्न-जटित गजरे के बिना, जो बाहर कम ही निकलती थी, उस विरहिणी की अब अस्त-व्यस्त वस्त्र-भूषा भी देखिये—

"अति मलीन वृषभानु कुमारी।
हरि-स्रमजल अन्तर तनु भीजे ता लालच न धुवावति सारी ॥
अधोमुख रहति उरध नहिं चितवति ज्यों गथ हारे थकित जुआरी ।
छूटे चिकुर, बदन कुम्हिलाने, ज्यों नलिनी हिमकर की मारी ॥"

हिम की मारी कमलिनी मुरझा गई। मन ही मर गया, तो वस्त्र-वसन मलीन नही होंगे ? प्रेम दीवानी, पसीनें से भीनी, मैली साड़ी चिपटाये हुए है। पीला पड़ा हुआ चेहरा, सूखी लटें, पदतल में बिजड़ित आँखें ! मानों साक्षात् मूर्तिमती करुणा ही हो !!

जिन आँखों में जादू था; जिनकी तिरछी नजर से, नटनागर ऐसे बेहाल हो जाते थे, कि न मुरली की सुध रहती थी, न पीतपट की: उन्हीं आँखों की दुर्दशा देखिए—

(क) देखी मैं लोचन चुऊत अचेत ।
[illegible] ॥

(ख) नैनघट घटत न एक घरी ।
कबहुं न मिटत सदा पावस व्रज लागी रहति झरी ॥

विरह-व्यथा से उत्पन्न विषाद, राधा के दिल में कितना गहरा बैठ गया था, यह महाकवि ने उसके मौन और मान-खण्डन से मुखरित किया है। उद्धव के सामने राधा अश्रुधारा ढारती रही, दो-चार शब्द भी बोली नहीं। दूसरी गोपियों ने खूब बकझक की, व्यंग्य बाणों की वर्षा की, और ताने कसे। लेकिन राधा न बोली और न ही बोली। सखियों ने जब हद की, और कृष्ण को भी खरी खोटी सुनाने लगीं—

"देखो माधव की मित्ताई ।
हम जाने हरि हितू हमारे उनके चित्त ठगाई ।
प्रेम निबाहि कहा वै जानै साँचेई अहिराई ॥"

तब प्रेम-दीवानी ज्यों-त्यों बोली—

"सखी री ! हरि हि दोष जनि देहु ।
जातें इते मान दुःख पैयत हमरे हि कपट सनेहु ॥"

कृष्ण—विरह में हम जी न सकेंगी, जोर-जोर से दावा करती थीं; लेकिन जब समय आया, तो विरह का शूल, हमारे कुलिश-कठोर हृदय को भेदने में असमर्थ ही रहा है। हमारे दावे ही झूठे थे, तो फिर दूसरे को ठग कहने का क्या अर्थ है ? कृष्ण कपटी हैं या हमारे प्रेम में ही त्रुटि है ! व्रज-सुन्दरी का, रूप के अनुरूप, हृदय-सौन्दर्य भी कैसा अपूर्व है ? दूसरों के मत्थे दोष न मढ़कर, अपना दोष देखने का नाम सुन्दरता है।

संयोग के समय की राधाके मान का, कोई अन्त न था। जब मान करने बैठती, तो कृष्ण के छक्के छुड़ा देती थी। बेचारे कृष्ण से पैरों में महावर दिलाती, वेणी में फूल गुंथवाती और पूरा श्रृंगार करा लेती। विरहाग्नि में तपकर, वह सब मान गल गया; अब पछता रही है कि क्यों मान करती थी, और क्यों ताने कसकर प्रिय के हृदय को छेद देती थी—

"मेरे मन इतनी सूल रही ।
वे बतियाँ छतियाँ लिखि राखीं जे नन्दलालाल कहीं ॥
सोचति अति पछिताति राधिका मूर्छित धरनि ढही ।
सूरदास प्रभु के बिछुरैं तें बिथा न जाति सही ॥"

प्रेम की अवज्ञा अक्षम्य अपराध है। इस अपराध की अनुभूति से, राधा को न दिन में चैन है न रात में—

"निसि न नींद आवै, दिन न भोजन भावै, मग जोवत भइ दृष्टि झांवरी ।"

वियोग का परिताप हृदय को कैसा उदार, कोमल और मुलायम बना देता है। राधा की सहिष्णुता देखिये—

करिहौं न तुमसे मान हठ, हठि हौं न माँगत दान ।
कहिहौं न चरनन देन जावक, गुहन बेनी फूल ॥
कहिहौं न करन सिंगार बट-तर, बसन जमुना-कूल ।
देहु दरसन, नन्द नन्दन ! मिलन ही की आस ।
सूर प्रभु की कुँवर-छवि को मरत लोचन प्यास ॥

तुम्हें बिल्कुल न सताऊँगी, तुम व्रज आओ; मैं ही, सौ बार तुम्हारे घर स्वयं आऊँगी । तुम्हारी मुख-छवि देखने को मेरी आँखें प्यासी हैं । विरह की व्याकुलता से पिघल कर, व्रज सुन्दरी उद्धव के पाँव पड़ती है और मान-लज्जा आदि छोड़कर बिनती करती है--

"ऊधो जू मैं तिहारे चरनन लागौं, बारक या व्रज करवि भाँवरी ।
सूरदास प्रभु बेगि दरस दीजै, होईहै जग में कीरति रावरी ॥"

ऊधो ! सिर्फ इतना प्रयन्न करो, कि कृष्ण एक बार व्रज में फेरा ही लगा जावें । मानवती, अलबेली के इस सन्देश में, कितनी करुणा और विवशता है ! दुःख सब द्वारों को तोड़कर फूट पड़ा है। संयम का बाँध, स्वजन के सम्मुख आखिर टूट ही गया । जिसने न बोलने की कसम खाई हुई थी, उसके बहते हुए आँसुओं ने, पुकार-पुकार कर सब कुछ कह दिया ।

सूर के विरह-सागर के कुछ मोती ही हम प्रस्तुत कर सके हैं । यह अगाध सागर, किस्म किस्म के कीमती मोतियों से भरा पड़ा है । हमने नन्द-यशोदा, गोप-गोपियें. गाय-बछड़ों, पशु-पक्षियें, लता-पादपें, मेघ-माला और चाँदनी रातों की बातें कही ही नहीं हैं ।

"कहँ लौं कहिये व्रज की बात ।
सुनहु स्याम ! तुम बिनु उन लोगन जैसे दिवस बिहात ॥
गोपी, ग्वाल गाय गोसुत सब मलिन-बदन कृस गात ।
परम दीन जनु सिसिर हेमहत अम्बुज गन बिनु पात ॥"

इस विरह-सागर में अभिलाषा, चिन्ता, स्मरण, गुण-कथन, प्रलाप, उद्वेग, उन्माद, व्याधि, जड़ता, मूर्छा आदि सभी अवस्थाओं के मार्मिक चित्र मौजूद हैं । वियोग के समय व्याकुलता, पीड़ा, औत्सुक्य, खीज, दैन्य, ग्लानि आदि के जितने भी भाव, मानव हृदय में उठ सकते हैं, उन सब के एक से एक मनोरम चित्र, सूर की तूलिका ने उतारे हैं । उन दशाओं और भावों की चर्चा करने बैठें, तब तो निबन्ध का कोई अन्त ही नहीं आ सकेगा । सिर्फ इतना ही कहना है कि सूर का विरह-वर्णन बड़ा स्वाभाविक, मर्मस्पर्शी, मौलिक उद्भावनाओं से परिपूर्ण, गौरवास्पद और संगीत की गूँज लिए हुए है । इसकी तुलना में, जायसी का विरह-वर्णन व्यर्थ की अतिशयोक्ति से भरा पड़ा है; बिहारी का विरह-वर्णन ऊहात्मक और हास्यास्पद हो गया है; मैथिलीशरण गुप्तजी के विरह-वर्णन में प्रयास है और रोना-धोना हद से ज्यादा है, जो रघुकुल के अनुकूल गौरवास्पद नहीं है ।

सूर के शृंगारिक पदों की रसवत्ता इसी से सिद्ध है, कि चार सौ वर्ष पहले लिखे गये इन पदों की गुणवत्ता से मुग्ध होकर, मूर्धन्य कवि रवीन्द्रनाथ ठाकुर पूछते हैं, हे वैष्णव कवि ! ये अनूठे प्रेम-गान तुम कहाँ से चुरा लाये हो, किसके रसीले नयनों का सौन्दर्य तुम्हारे हृदय में समाया हुआ है, किसके विरह का परिताप तुम्हें अहर्निश बेचैन बनाये हुए है—

"सत्य करे कहो मोरे हे वैष्णव कवि !
कोथा तुमि पेये छिले एइ प्रेम छबि !
कोथा तुमि शिखे छिले एइ प्रेम गान !
विरह तापित ! हेरी काहार नयान ।
राधिकार अश्रु आँखि पड़े छिलो मने ।"

अर्थात् हे वैष्णव कवि ! सच बताओ, तुमने यह प्रेम-छवि कहाँ से प्राप्त की ? उन्मत्त बना देनेवाले ये प्रेम-गान तुमने किससे सीखे ? किसकी आँखें देखकर राधा की आँसूभरी आँखें तुम्हारे मन में समा रही हैं ?

जौहरी ही, पुखराज को ठीक परख सकता है । महाकवि ही, दूसरे महाकवि की कला-सिद्धि का, खरा मूल्यांकन कर सकता है ।

—:o:—

SOME STUDIES ON OPTIMIZATION IN CONCRETE STRUCTURES

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This study having pragmatic approach, aims at the structural optimization of various repetitive concrete structures such as transmission line poles, pressure pipes, purlins, one-way and two-way floor slabs, beams and columns within the framework of design codes, construction practice and availability of materials, all with relavence to Indian conditions.

The available optimization techniques are reviewed regarding their scope, advantages and limitations, with respect to the problem under investigation. The "Selected Active Constraints Technique (SACT)" has been developed for the solution of non-linear programming problems of interest in this investigation. Simplicity, validity, stability, quickness and geometrical interpretations of SACT have been discussed.

Various optimization techniques such as linear programming, non-linear programming, calculus of extremum and exhaustive search are used successfully for the solution of the design problems formulated for a class of concrete structures. The case studies presented reveal tremendous economy both in cost and quantity of materials, over conventionally designed members, for present conditions in India.

Prestressed concrete vierendeel type poles are observed to be cheaper as compared to fully or partially prestressed rectangular type poles or reinforced

rectangular type poles. Checks for the optimality have been made using Lagrangian multiplier technique. In a case study, it has been shown that Gujarat Elec. Board can save Rs. 26 lakhs annually, by adopting the optimal design for 853 cm/204 Kg. poles.

The problem of non-cylinder composite prestressed concrete pressure pipes has been formulated as a linear programming problem. The case study of Madras-Veranam Lake 230 Km. long pipe line, indicated a saving of Rs. 2.91 crores in materials over the design adopted for the project. Checks for the optimal design solution satisfied the transient loadings and possible load combinations.

For reinforced concrete slabs, the combination of low strength concrete, high strength steel and inelastic analysis-elastic design is seen to be optimum and this is economical by at least 15% over the conventional combination used in the design practice.

The combination of high strength concrete, low strength steel and minimum possible percentage of longitudinal reinforcement, has been observed to be optimum for axially loaded reinforced concrete rectangular columns.

A structural layout using bay system for high-rise buildings utilising cost interaction of slabs-beams-columns is possible to obtain for minimum cost and for a given functional requirements.

Sensitivity analyses are undertaken to check the stability of the optimal design solutions obtained in this study.

Suggestions have been also made for future research work regarding other promising structures for optimization.

SUMMARY OF THE THESIS-A STUDY OF THE AGRICULTURAL IMPLEMENTATION PROGRMME*

By

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I THE PROBLEM OF THE STUDY

The study is mainly concerned with the process and problems of implementation of the agricultural development programme in one Taluka of a District in South Gujarat. The agricultural programme consists of the popularization of chemical fertilizers, improved seeds, pesticides, irrigation and distribution of agricultural credit.

To start with the study tried to locate the gap between agricultural programme and actual state of affairs in the village setting. After locating the gap, the focus has been shifted to causes that create the gap. The causes have been formulated into the followihg hypotheses for emperical testing.

Hypotheses

I The sarpanches who represent their respective villages at taluka level have enough vested interest and manipulate aids to their villages.

II The agricultural bureaucracy is at times forced and at times willing to take

* The thesis was prepared under the guidance of Dr. H.J. Pandya, Head, Department of Public Administration, South Gujarat University, Surat. The field-work for the study was done during the years 1971 and 1972.

sides with the powerful farmers and their representatives who have a place in the taluka panchayat.

III In the village setting Government aid is mostly manipulated, to their advantages by rich farmers.

IV Some multi-caste villages are classified as adivasi villages because of their population composition, but the benifits which are diverted to these areas on the basis of their backwardness are cleverly manipulated by the rich upper caste farmers of the villages.

V The corruption, delays, inefficiency and indifference of the administrative staff has created a large gap between the aid programmes and farmers of small and middle levels.

VI The middle class and small farmers are even to-day to a great extent dependant on traditional methods of agriculture and conventional sources of help for irrigation, agricultural loan, chemical fertilizers, hybrid seeds and pesticides.

VII The middle class and small farmers are at a disadvantageous position partly because of their hesitation to take risk with improved seeds, chemical fertilizers etc. due to their economic condition.

The above hypotheses have been examined through the three units namely farmers, administrative staff and leaders.

II METHODOLOGY

1. Sampling :

The Universe of Inquiry:—There were three categories of sample for farmers, administrators and leaders.

Farmers:—For intensive study 150 farmers (5%) were selected from 10 sample villages on the basis of stratified random sampling. The 150 farmers who were selected for study belonged to different categories such as upper class 17, middle class 35 and lower class 98.

Administrators:—About 16 personnel of administrative staff working at village and taluka levels and who were involved in the process of agricultural development were also interviewed with respect to the process and problems of agricultural development.

Leaders:—The sarpanches who were the members in Executive, Production and Co-operative Committees of the taluka panchayat were also interviewed in this connection, especially for the problems of the farmers in their villages and the taluka as a whole. Besides the above sarpanches, the sarpanches of the 10 selected villages for the study were also interviewed in this connection. Thus in all 29 sarpanches were interviewed.

2. **Data Collection:**—Three different types of interview schedules were prepared and canvassed personally, one for each category of the samples mentioned above. The data thus collected were further supplemented through the informal talks not only with the respondents but also with a few other farmers, administrators and leaders. Data from records of the village, taluka and district level agencies involved in agricultural development were also collected.

III MAIN FINDINGS

While examining the targets and achievements of various crops at district, taluka and village levels, it was revealed that, so far as paddy crop was concerned the district could not achieve the desired targets during the year of 1968–69, 1970–71 and 1971–72. Similar was the case for Kharif Jowar and wheat during the year of 1968–69 to 1970–71. While at the taluka leval it was revealed that, it could not achieve targets during 1970–71 and 1971–72 for paddy crop and for the wheat crop it had failed to achieve targets for all the years from 1968–69 to 1971–72.

So far as sample villages are concerned it was revealed that only 40% of the sample villages during 1970–71 and 80% of the sample villages during 1971-72 have failed to achieve the target in paddy crop. The corresponding figures for wheat crops were 30% in 1970–71 and 40% in 1971–72.

This shows that a gap exists between the targets and achievements at all the three levels.

To ensure success of agricultural development, co-operative efforts among the farmers, administrative staff and leaders are essential. But not much progress in this direction is achieved.

At grass-root level, the VLWs are the key personnels entrusted with the

implementation of agricultural development programme. This requires the close contact with the farmers. But it was reported by 67.33% of the farmers that VLWs have not tried to contact them. Generally they are in contact with the farmers belonging to the upper class, castes and better educated farmers.

The situation in this regard between the taluka level officials and farmers was more disappointing. The Agricultural Extension Officers contacted only 6% of the respondent farmers. Like VLWs these officers were in contact with the upper caste farmers.

It was also revealed that the farmers on their side, did not try to contact either the VLWs or the taluka level officials with their problems on their own. Thus only 14.66% of the farmers have met VLWs on their own, while only 2 out of 150 farmers reported that they had met Agricultural Extension Officers on their own.

About 81.25% of the administrative staff members had reported that the farmers approached them with their problems. Those who had come for advise and help, about 80% of the farmers belonged to upper class while 20% from middle class.

It is revealed that larger proportion of the farmers do not contact the leaders with their problems Only 41.37% of the leaders reported that the farmers come to them with their problems. Out of these 41.37%, about 66.66% reported that the farmers belong to middle and lower class. Thus it is clear that the upper class farmers go to the administrators to solve their problems, while lower and middle class farmers mainly contact local leaders.

The administrators have reported that the most of the advantages have been taken by the non-adivasi dominated villages. About 56.25% of them reported that the advantages have been taken by the upper class farmers and 43.75% reported that the advantages have been taken by the upper and middle class farmers.

About 96.56% of the leaders reported that non-adivasi dominated villages have taken the best advantage. About 93.10 of the leaders reported that most of the advantages have been taken by the upper class of the farmers, while 6.90% reported that the most of the advatages have been taken by the upper and middle class farmers.

This is enough to state that the lower class farmers could not take the advantages of agricultural development.

IRRIGATION

So far as irrigation facilities are concerned, 43.87% of the lower, 60% of the middle and 52.35% of the upper class farmers have such facilities.

Those castes which are higher in social hierarchy have better irrigation facilities. Thus 60% of Anavils, 66.66% of Rajputs, 90.46% of Patidars and 100% Parsis have such facilities. While a majority of the Kolis, Dhodias, Naykas, Harijans, Muslims and Prajapatis lack such facility.

It is also revealed that the extent of the utilisation of irrigation facility depends on education of the farmers. Of the farmers those who have irrigation facility, about 27.27% are illiterate, while 50% of the primary, 64% of the secondary and 100% of the college educated farmers have such facility.

AGRICULTURAL CREDIT

Out of 38 co-operative societies covering all the villages of the taluka, 4 societies provide short-term credit in cash, 7 provide in kind, 18 provide both in cash and kind, while the remaining 9 societies do not provide such help. On the other hand medium term loans are given by 50% of the co-operative societies.

About 28% of the respondent farmers have taken long-term loans for various purposes. Those who have taken loan, most of them have taken from LDB. Out of the 28% of respondent farmers who have availed the facilities of the loan, 25.51% belongs to lower class, 31.42% belongs to middle class and 35.59% belongs to upper class farmers.

According to caste cent per cent soni, 50% of Parsis, 42.85% of Patidars, 40% of Anavils, 33.33% of Rajputs, 33.33% of Dhodias, 33.33% Valand, 28.57% of Muslims and 28.53% of Kolis have taken loans.

While according to education 15.15% of the illiterate farmers and 27.27% of the primary, 32% of the secondary and 50% of the college educated farmers have taken loans. This shows impact of education on the farmers in getting facilities from such banks.

So far as the difficulties faced by the farmers in getting loans from LDB are

concerned, about 45.71% of those respondent farmers who have taken loans from LDB reported that they had difficulties in getting loans.

USE OF CHEMICAL FERTILIZERS, IMPROVED SEEDS AND PESTICIDES

About 88% of the farmers use various types of chemical fertilizers, while the corresponding percentages of the farmers using improved seeds and pesticides are lower viz. 44% and 54% respectively.

Of the lower class farmers, about 87.75% use chemical fertilizers, 50% use improved seeds and 46.93% use pesticides. The corresponding percentages of middle class and upper class farmers are 91.42% and 82.35%, 25.71% and 47.05% and 65.71% and 64.70% respectively.

In terms of caste it is revealed that a majority of the upper castes make use of the above three items while scheduled castes and tribes are lagging behind in this respect.

The use of the above three items seems to be related with level of education of the farmers. About 39.40% of the illiterate farmers do not make use of chemical fertilizers, while about 69.70% do not use improved seeds and 81.82% do not use pesticides. While the corresponding percentages for primary, secondary and college educated farmers are lower.

Most of the farmers, irrespective of class, caste and education buy chemical fertilizers from co-operative societies, while improved seeds from private sources and a good number of farmers buy pesticides from private sources.

In order to acquire chemical fertilizers 32.60% of the total user farmers had difficulties in getting it. Of this about 71.42% of the farmers belong to lower class. It decrease with middle and upper class viz. 22.44% and 6.12% respectively.

Generally there are no difficulties to get improved seeds because the farmers mainly manage to get it from their friends, relatives and other known farmers. The difficulties for getting improved seeds are only, with lower class farmers.

Regarding the pesticides about 22.22% of the users have difficulties. It is the highest with lower class farmers viz. 77.77% while it decrease with middle and upper class.

Examining the difficulties according to caste it is revealed that the Dhodias, Kolis, Naykas, Halpatis etc. have more difficulties than upper castes to get chemical fertilizers.

To get improved seeds among the users, only a few famers have difficulties. The percentages of those who have difficulties are 100% of Naykas, 60% of Dhodias and 50% of Tandels. From Kolis and Patidars only one from each caste has such difficulties.

In getting pesticides, parsis, patidars, Rajputs, Prajapatis, Bhandaries, Halpatis, and Harijans have no difficulties. Of the users 100% of Valands, 66.66% of Muslims, 42.85% of Dhodias and 40% of Anavils have such difficulties.

Thus it is revealed that the upper class, caste and better educated farmers have taken good advantage of agricultural development programme.

Summary Of The Thesis On A STUDY OF THE ENGLISH LANGUAGE USED IN INDIAN PRESS ADVERTISING

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This study is an attempt at a linguistic analysis of the language of Indian Press Advertising in English. Advertising, which exploits all the linguistic resources of language, is a form of communication which has a rapidly increasing impact on modern man.

The questions of the purpose and motivation of the advertiser and the copy-writer, and the effect of advertising messages on the reader, though fundamental to the understanding of the whole advertising situation, are beyond the scope of pure linguistic analysis, which is the aim of this work and, as such, they have not been dealt with here. However, this study can form the nucleus of an exhaustive sociolinguistic inquiry.

The theoretical framework of this thesis is Hallidayan but transformation theory has been employed to deal with distinctions in depth. The method of presentation adopted in the analytical chapters is to explain the systemic choices with examples from the corpus, followed by a summary of the findings regarding these choices.

The study begins with an investigation into the various linguistic techniques adopted by the 'adman' to create expressive and attractive advertising messages : The two main techniques exploited are (1) Linguistic unorthodoxies and (2) Rhetorical devices, while the main linguistic deviations employed are (1) Grapho-logical violation and (2) Grammatical violation. Recourse to Disjunctive Grammar

enables the copywriter to leave unexpressed items of low information value, the result being conciseness and immediate comprehensibility. This device is often used in all the elements of the Indian copy but in British advertising it occurs with comparable frequency only in headlines, subheads and signature lines. The Indian advertising man seems to find syntactic parallelism an effective technique for impressing the slogan on the reader's mind. The identity of the class exponents of the elements of structure in these cases is generally fully or almost fully complete, and the difference lies in the lexical items.

In almost all advertising slogans nominal groups have a predominence over verbal groups, and sometimes whole messages are put across with zero predicators.

In this register, verbs which have the highest frequency of occurrence are those that express one aspect or another of the relationship between the consumer and the product. Multiple-hyphenated modifiers, most of them neologisms, occur very often in Advertising, with combinations of any two or more word classes.

The maximum structural complexity in Advertising lies at the level of the group. Nominal groups, with both premodification and post-modification, are the most complex and are most frequently found in headlines and signature lines. The tendency in both Indian and British Advertising to place multiple modifiers before nouns often results in making meaning dependent almost entirely on the context.

The passive voice, employed frequently in other technical registers, is conspicuous in this register by the rarity of its use, the obvious reason being that the impersonality which the passive voice suggests is exactly what the copywriter seeks to avoid.

Turning to the system of mood at the level of the clause, it was found that the most frequent choice of the copywriter, as of all users of the English Language, is the declarative mood, S P (O/C) (A) but what is unique about this register is its use in clause structure, of the imperative mood, P (O/C) (A), the function of which in Advertising is not the expression of commands but of suggestion and persuasion.

Most finite clauses in Advertising language are independent constructions. The subordinating conjunction, 'when', which generally introduces time clauses, also performs, as often, the function of the conditional conjunction in this register. Minor clauses, like non-finite clauses, are employed in all elements of the advertising

copy, their most common structure being the combination of a nominal group and an adverbial group.

In Indian and British Advertising the most frequent marked theme is the A-Theme or Adjunct theme, which foregrounds the information unit contained in the adjunct. The Comment adjunct theme, however, is much more infrequently used by the Indian copywriter than by his British counterpart.

Clauses in Indian advertising messages sometimes have no participant roles at all, with the result that the process role carries the whole weight of the message.

In this register, verbs which convey the suggestion of commitment, e. g. 'give' are normally ditransitive, and have, interestingly enough, 'you' as the beneficiary.

The sentence, which can be considered to be the fudamental unit of communication, is the largest unit analysed in this study. Headlines and signature lines in Indian Press Advertising often consist of sentences whose structure is nominal group + relative clause, where the clause is dependent on the group and not on an independent clause. Advertising language sometimes indicates the conditional relationship through co-ordination rather than throuh subordination which would have helped to make the relationship clearer.

Reflecting a new trend in usage, non-linking paractactic clauses are frequently found in Advertising; in fact, they can be regarded as an alternative to linked co-ordination.

This investigation makes it clear that there are several outstanding linguistic features peculiar to Indian Advertising.

R. K. NARAYAN : A CRITICAL STUDY

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The object of this thesis is to study systematically and critically R. K. Narayan's prolific contribution–ten novels; six collections of short stories; two volumes of essays and sketches; his travelogue, titled, **Mysore**; his **Diary;** mythological stories and legends retold by him; **The Ramayana,** his rendering of the Indian epic in English; his autobiography, **My Days** and his articles and stories contributed to different Journals and to analyse and evaluate the achievements of the author. An effort is made to analyse and interpret the life portrayed in Malgudi, his mythical kingdom and to distinguish the author's approach to Indian life from that of some other prominent writers and evaluate the significance of Narayan's contribution. For the sake of convenience the thesis is divided into three parts. **Part I** deals with the author's novels; **Part II** deals with his short stories and **Part III** discusses his miscellaneous works and his thoughts on education.

Chapter I discusses the significance of Malgudi, the setting of the author's novels. It is entirely different from the romanticized version of India with which Westerners are familiar. Though small, old, shabby in the beginning, the town palpitates with life. It is constantly developing. It seems to be a strange mixture of the traditionalist East and the ever changing West. It is India in its essence—India of the common man. Narayan's setting is appropriate as well as authentic. The sense of intimacy with the town helps Narayan in creating a better understanding of the life of the people. This strong sense of locale with which Malgudi

novels are imbued helps the author to establish a feeling of solidity, reality, and intimacy. The topographical knowledge is imparted subtly through little unobtrusive details. The illusion of reality is created by an imperceptible blending of the elements of setting and people. Malgudi is predominantly a Hindu town and in his novels the author presents a cross-section of Hindu middle-class society.

Chapter II seeks to study the people. They belong to one common stratum of society. They conform to socially accepted patterns. Their belief in religion remains unshaken. Yet Narayan's novels are secular. The members of this society cannot keep themselves isolated from the impact of some of the new Western ideas and influences. Consequently, their souls are often torn by the contending forces of tradition vis-a-vis modernity. Keen and discriminating observation of people in Mysore and other places enables Narayan to build up characters for his world of fiction. He creatively reconstructs his models and vivifies them. He has attraction for eccentric people but he is not interested in eccentricity for its own sake. Narayan has introduced a few alienated characters also. His characters are obsessed with one thing or another. Narayan puts the "ordinary" to a creative use and weaves his plot. His characters shoot up like meteors only to fall back to normalcy sooner or later. For they often do what they ought not to and are perpetually involved in crisis. Narayan has no heroes; he has only non-heroes and, of course, no heroines. His female characters can broadly be described as nameless chewers of betel-nut and tobacco. In his world of characters we often recognise something of ourselves.

Chapter III deals with Narayan's art and traces its development. It studies organization of Narayan's novels, and the time-sequence. A study of his novels in chronological order reveals how his art develops from the chronicle type of plot structure of his first novel, **Swami and Friends** to the well-integrated, dramatic, and organic structure of **The Sweet-Vendor.** His plots usually depend on the main characters of his novels, though sometimes the characters are pushed about by the exigencies of the story. Consistency and plausibility are the characteristics of his plots. Narayan hardly uses the idea of fate or accident as an essential part of his plots. His themes are built round Indian beliefs and superstitions. These themes are integrated with characterization and the structure of the plot. Narayan often assumes omniscience and describes his characters from within. Narayan may not be an expert craftsman but he has a penetrating eye on the texture of life.

Chapter IV deals with the attitudes of the novelist as revealded in his novels. Narayan belongs to no " school " or clique. He introduces no ' isms '. The old condemnatory tone found in the novels and stories of the Indo-Anglian fiction is absent in his fiction. The question of the freedom of the individual is considered on the basis of some fundamental concepts of Hindu thought and ways of life such as **Dharma, Karma, Varna** and **Moksha.** Narayan allows sufficient freedom of will to his characters. His people are not doomed to disaster. There is always hope for the future. **Karma** is interpreted in different ways by different characters. Life in Malgudi has many good things to offer but if people act in a wrong way they have to suffer. Thus, Narayan seems to believe that character is destiny. Also he seems to believe in the balance of power in human relationship and life after death. The world of Malgudi illustrates to a large extent the scheme of llfe suggested by the **ashrama** system. Narayan knows the value of reticence. His moral values are implied rather than stated clearly. In his novels Narayan does not flourish his axe in an aggressive manner. He creates successfully the illusion of life. His general outlook towards social and religious institution is that of acceptance. Even when he criticizes a set practice or a religious custom or tradition, his criticism is very mild. His satire is directed more against individuals than institutions. Irony is Narayan's most potent weapon. Narayan is aware of the generation-gap that exists between the old and the young. In Narayan's fiction there is acceptance of life. Woes are to be tolerated. Life is too precious to be wasted away for any reason whatsoever.

Chapter V seeks to study Narayan's famous novel, **The Guide.**

Chapter VI, Part II, Seeks to study his short stories which are based on varied themes ranging from innocent childhood, the financial worries of the lowest class people, the gullibility of the poor, innocent, uneducated people, motherly love, appalling waste of human lives on account of communal riots, to the problems of marriage. The importance of the collections lies in the freshness and originality of the stories; portraiture of characters with a few decisive strokes of an artist; presentation of life full of variety; sympathetic and humorous treatment of the subject matter; elegant simplicity of language and strict economy of narration; the author's attitude to life; the essential Indianness of stories; his message communicated through them and unobtrusive handling of the supernatural elment. Narayan's

sympathy for the waifs—the pickpockets, labourers, coolies, rickshaw-pullers, gamblers, clerks—is extended towards birds, animals and even insects. Though the scene often shifts from Malgudi to Madras, and Mempi forest to Bangalore, the general atmosphere remains unchanged. The chapter attempts to bring out points of contrast between Narayan's novels and his short stories and tries to establish the proposition that the study of Narayan's short stories is indispensable for the fuller understanding of the author and his art. Narayan wrote these stories to expose "the tyranny of love and to see if life could offer other values than the inevitable man-woman relationship". Some of these stories bring out the intense awareness of human loneliness. Narayan's ghost stories centre upon the haunting of a dead person and reveal his skill in evoking weird atmosphere and handling of the technical terms of occultism. Narayan humanizes the ghost. He wields suspense successfully. An attampt is made to study Narayan's first story, titled, 'A Breach of Promise', in details.

Chapter VII, Part III, discusses the importance of **Mysore,** a book which apparently looks like **but is really not** a Guide to Mysore and the district. It is a work of art. The book presents a delightful accout of different places visited by the author, and conveys Narayan's impressions and reactions of his journey. The book establishes once for all the author's reputation as a great landscape painter. The legends and anecdotes narrated here provide us with some background for the proper understandlng of his works.

Chapter VIII deals with the stories retold by the author in the book, titled, **Gods, Demons, and others.** The avenue to mythology provides an interesting change from the usual run of novels and short storles. The concepts of Hindu philosophy of **Dharma, Karma,** and **Moksha** help us to understand and explain the behaviour and fate of some of his characters.

Chapter IX shows how Narayan came to write his English verson of the great epic, **The Ramayana**. Narayan's verson is based on Kamban's Tamil verson of the epic.

Chapter X discusses Narayan's latest publication, namely, **My Days** which is his autobiography. The book has great significance in the total corpus of Narayan's work. It helps us to understand the author, his characters, his novels and stories.

his views on life and education, and so on. The book opens with Narayan's life in his grandmother's house in Madras, shows the struggles he had to face and ends formally with the description of how he is happy in having congenial work to do in his old age. Narayan's frankness, candour and boldness are admirable. Intimacy, humour, effortless style, vivid descriptions, fine sketches of birds, animals and persons he came in contact with in different capacities, his close observation of men and matters and deep understanding of life and its ways—these are very well reflected in the book. The total picture of the personality of the author that emerges from his work is that of a hardworking, sincere, resourceful, adventurous optimist.

Chapter XI seeks to consider Narayan's **Dateless Diary** which throws interesting sidelights on the author's personality. The diarist himself emerges as a very likable character—generous, learned, inquisitive, frank. and clear-headed. His philosophy of **Karma,** views on religion. his mystic experiences, his liking for the joint family system, his interest in local prejudices, his wide sympathies, dIscussions on a variety of subjects—these help us to put his novels and stories in a proper perspective. The importance of the **Diary** is not in its datelessness but in its being the **Diary** of a novelist, narrating vividly not merely fictitious but real experiences of his visit to the U. S. A. and portraying characters and actions from real life in a very delightful manner.

Chapter XII seeks to deal with Narayan's essays and sketches. His essays deal with a variety of subjects. His treatment of the theme is often analytical. His essay is a short composition. As it is full of digressons, it is difficult to keep track of all that he says. His aim is not to elevate or to philosophize but to interpret brief moments of experience and amuse his readers. There is a fine quality of humour about his essay. He introduces personal touch and places himself in close intimacy with his readers. He tells frankly what he likes and what he despise. He hates detective stories and films dealing with crimes. He satirizes redtapism and narrow-mindedness and provincialism. Originality, freshness, choice of apt words, simplicity, informality, vividness, play of fancy, keen observation, humour interspersed with occasioal flashes of satire, interest in commonplace things—these are some of the characteristics of Narayan's essay His style cannot be linked with any prototype. He coins words and is free with loan words from Indian languages. He often gives a serious subject a humorous twist and makes it light and enjoyable.

It is not easy to pronounce judgment on a living author. However **Chapter XIII** tries to evaluate the author's achievement. Narayan has a sharp talent for precise observatiton. In the portraiture of characters his strokes are few but decisive. Narayan dislikes all colour and passion. Simplicity, lucidity, clarity, unhurried pace **and genial humour** are some of the characteristcs of his style. His vocabulary is pretty large; his descriptions are vivid and short but suggestive. He does not portray nature in his novels and stories, for it is not necessary for him to do so.

An effort is made to study Narayan's stray thoughts on education expressed by him in his essays and novels and stories. Narayan deals with all types of educational institutions from **pyol**–school to college. He presents good and bad teachers side by side. He discusses the problems of discipline, parental control, physical education, religious education, examinations, teaching of poetry, spelling, essay–writing and so on. Through his realistic description, Narayan underlines the need for a reform of our traditional system of education. In **The English Teacher** which can justly be described as Narayan's treatise on education, Narayan gives shape to his vision. The Headmaster's character serves as his mouthpiece and in his educational observations we hear the echoes of Narayan's voice. The method of supervised study, according to Narayan, will go a long way towards the solution of our educational problems. These, broadly speaking, form the contents of the last chapter, that is to say, **Chapter XIV,** titled, 'Narayan's Thoughts on Education.'

"'સરસ્વતીચંદ્ર'માં સમાજમીમાંસા"

ડૉ. સી. પી. પટેલ,
એમ. એ., પીએચ. ડી.
ગુજરાતીના પ્રાધ્યાપક અને
અધ્યક્ષ, અનુસ્નાતક કેન્દ્ર,
આર્ટ્સ એન્ડ કોમર્સ કોલેજ,
તલોદ (જિ. સાબરકાંઠા).

'સરસ્વતીચંદ્ર' એ એના કર્તા ગોવર્ધનરામની તેમજ ગુજરાતી સાહિત્યની ચિરંતન કૃતિ છે. સાડા અઢારસો પૃષ્ઠ જેટલો પ્રસ્તાર ધરાવતી આ બૃહન્નવલનો પ્રથમ ભાગ ઈ. ૧૮૮૭માં, બીજો ભાગ ઈ. ૧૮૯૨માં ત્રીજો ભાગ ઈ. ૧૮૯૮માં અને ચોથો ભાગ ઈ. ૧૯૦૧માં પ્રકાશિત થયેલ.

આ નવલકથા એના કર્તાની ઉદ્દેશ્યપ્રધાન કૃતિ છે. ઓગણીસમા શતકના ઉત્તરાર્ધમાં ભારતીય જનસમાજ સંક્રાન્તિકાળને આરે ઊભો હતો. એના ચિદાકાશમાં અનેકવિધ પ્રશ્નો ઘૂમરાયા કરતા હતા. પ્રાચીન અને અર્વાચીન ભારતીય તથા અર્વાચીન પ્રાશ્ચાત્યએ ત્રિવિધ સંસ્કૃતિઓના સંઘટ્ટનથી સર્જાયેલા ઘુમ્મસઘેર્યા વાતાવરણમાં કયો માર્ગ ગ્રહણ કરવો એ તત્કાલીન જનસમાજ માટે વિકટ પ્રશ્ન હતો. ગોવર્ધનરામ પોતાના દેશજનોને યોગ્ય માર્ગદર્શન આપી ભાવિ તરફ અંગુલીનિર્દેશ કરવા કટિબદ્ધ થાય છે. તેમણે ભારતીય અને વિદેશી સાહિત્ય અને અન્યગ્રંથોનો તલસ્પર્શી અભ્યાસ કર્યો હતો. એના મનન ચિંતન દ્વારા તેમણે વિશિષ્ટ દર્શન પ્રાપ્ત કર્યું હતું. આ દર્શન પોતાના દેશવાસીઓ સુધી પહોંચાડવા 'સરસ્વતીચંદ્ર'ની રચના કરી.

પોતાના વિશિષ્ટ દર્શનને રજૂ કરવા માટે તેમણે આ ગ્રંથની ચોક્કસ યોજના કરી છે. માનવજીવનનાં ગૃહ, કુટુંબ, સમાજ, રાજ્ય, ધર્મ, આદિ પાસાંઓની વિશદ ગવેષણા રજૂ કરી છે. આ માટે તેમણે વર્તમાનની પરિસ્થિતિનું ચિત્રણ રજૂ કરી તેની હરોળમાં પ્રાચીન ભારતના ભવ્યવારસાનું દર્શન કરાવી વર્તમાનમાં રહેલી વિકૃતિઓ તરફ ધ્યાન દોર્યું છે. એની સાથે પશ્ચિમના ધસમસતા પ્રવાહને મૂકી ભાવિ પ્રગતિ માટે કઈ દિશા તરફ જવું તેનો સૂચન દ્વારા નિર્દેશ કર્યો છે.

તત્કાલીન હિન્દુ સમાજમાં સ્ત્રી એક સળગતી સમસ્યારૂપે હતી. ગૃહક્ષેત્રે ગૃહિણીની બેહાલીને લીધે

અનેકવિધ વિકૃતિઓ પેદા થઈ હતી. સાસુવહુ અને નણંદભોજાઈના સંઘર્ષ તથા સ્ત્રી પ્રત્યેના અણછાજતા વર્તનને કારણે આપણા ગૃહસંસારમાં અને દામ્પત્યજીવનમાં હોળી પ્રગટી હતી. આ સમસ્યાઓના નિરાકરણ માટે ગોવર્ધનરામે પશ્ચિમની વ્યક્તિવાદી કુટુંબપ્રથાની હિમાયત કરી છે. ગૃહિણી માટે કેળવણી અને સ્વતંત્રતાની અનિવાર્યતા તેમણે નિર્દેશી છે. સંસ્કારી અને કેળવાયેલી ગૃહિણી જ ઘરની શોભા બને તેમજ ગૃહસ્થના કામમાં પણ મદદરૂપ થઈ શકે; સંતાનોને સારા સંસ્કાર આપી ભાવિ પેઢીને ઉન્નત બનાવી શકે; દામ્પત્ય–જીવનમાં સુવાસ પ્રગટાવે. ગૃહિણીઓને જડ અને રૂઢિચુસ્ત વલણ ધરાવનાર સાસુઓ, નણંદો અને વડીલોથી બચાવી લેવાની જરૂર છે. સંસ્કારી વિશાળ હૃદયી અને કેળવાયેલાં ગૃહિણી ગૃહસ્થ વાનપ્રસ્થ બને ત્યારે પોતાનાં સંતાનોના ગૃહસંસાર કે દામ્પત્યજીવનમાં જરૂર જણાય તો જ, તેમાં ડખલ કર્યા વિના, પોતાના અનુભવના નિચોડરૂપ સલાહ ક્યારેક આપે તો વાંધો નહિ. ગોવર્ધનરામ પશ્ચિમની કુટુંબપ્રથાની હિમાયત કરે છે, છતાં તેમાં કેન્દ્રસ્થાને પ્રાચીન ભારતીય ભાવનાને મૂકે છે. એમના આ ઉકેલમાં શાસ્ત્રીયતા અને પ્રગતિશીલતા છે.

એમની લગ્ન–દામ્પત્ય–મીમાંસામાં પણ પ્રાચીન ભારતીય અને અર્વાચીન પ્રાશ્ચાત્ય ભાવનાઓનું સંમિશ્રણ છે. તેઓ લગ્નવિધિની પવિત્રતાને અનિવાર્ય માને છે. લગ્ન એ અતૂટ સ્નેહબંધન છે, તથા રસૌક્ય, મનઐક્ય, મૈત્રી અને લોકસેવા જ દામ્પત્યના પાયા અને મિનાર છે. તેથી એમાં વિચ્છેદ કોઈપણ સંજોગોમાં સ્વીકાર્ય બની શકે નહિ એ મંતવ્યથી તેઓ સ્મૃતિકારોના દર્શનમાં રહેલી મર્યાદાને સુધારી લે છે. પાત્રપસંદગીમાં સ્વતંત્રતા, બંને પાત્રો વચ્ચે સુસંવાદિતા અને સમાનતા, વગેરે બાબતો તેઓ પશ્ચિમની વિચારણામાંથી સ્વીકારે છે. બંને પાત્રોને પોતાના આચાર–વિચારમાં સ્વતંત્રતા ખાતર સ્વતંત્રતા દામ્પત્યજીવનમાં સુસંવાદિતા માટે કદાચ આડખીલીરૂપ બને તેથી ભારતીય ભાવના પ્રમાણે તેમનામાં સર્વ રીતે એકબીજામાં પોતાના સ્વત્વને લીન કરવાના ઉચ્ચાશયની તેઓ હિમાયત કરે છે. બંને સંસ્કૃતિઓમાંથી અર્ક ખેંચી તત્કાલીન વાતાવરણના સંદર્ભમાં તેને ઘાટ આપવા તેઓ પ્રયત્ન કરે છે.

સમાજવ્યવસ્થા બાબતમાં તેઓ માનવીની વિશિષ્ટ શક્તિઓને, નિરર્થકપણે વેડફવાને બદલે, સંપૂર્ણપણે સમષ્ટિના કલ્યાણમાં જોતરવા સૂચવે છે. માનવીને પોતાની શક્તિ અનુસારનું કાર્યક્ષેત્ર મળી રહે એ જરૂરી છે. સમાજમાં રાજા અને કારીગર, સ્ત્રી અને પુરુષ, દરેકની કામગીરી મહત્ત્વની છે–સમાજને દરેકની એટલી જ જરૂર છે. આમ છતાં વિશિષ્ટ શક્તિ ધરાવનાર વ્યક્તિઓને શિરે મહત્ત્વની જવાબદારીઓ સોંપવાનું તેઓ સૂચવે છે. રાજ્યવ્યવસ્થામાં દીવાનની કામગીરીને તેઓ મહત્ત્વ આપે છે. સુંદરગિરિ પરના સાધુઓ આપણા સ્મૃતિકારોના જેવી, કામગીરી બજાવે છે.

જીવનવ્યવસ્થામાં તેઓ પ્રાચીન આર્યભાવનાને, કેટલાક ફેરફારસહિત, સ્વીકારે છે. વિદ્યાપ્રાપ્તિ પછી પુખ્ત વયે જ ગૃહસંસારનો પ્રારંભ થાય એવું તેઓ નિર્દેશે છે. ગૃહસ્થના પંચમહાયજ્ઞની ભાવનાને તત્કાલીન જીવનસંદર્ભમાં તેઓ પુનર્જીવિત કરે છે. યોગ્ય સમયે વાનપ્રસ્થ સ્વીકારવાની તેઓ ખાસ હિમાયત કરે છે. આધુનિક સમયમાં ગૃહસ્થાશ્રમ અને વાનપ્રસ્થાશ્રમની જ શક્યતા તેઓ બતાવે છે. આ ઉપરાંત માનવીની

પ્રવૃત્તિને સનાતન–વિશ્વ–ધર્મના પાયા પર મૂકે છે. તેમને મતે, ધર્મ એ ક્રિયાકાંડોમાં નથી પણ માનવીના જીવાતા જીવનમાં–એના આચારવિચારમાં–નિહિત હોય છે.

સમકાલીન સંસ્કૃતિમાં પ્રતીત થતી વિકૃતિઓનું તેઓ કુમુદ–સરસ્વતીચંદ્રના સંગતસ્વપ્ન દ્વારા દર્શન કરાવે છે, અને તેને પ્રાચીન ભારતીય સંસ્કૃતિના સંદર્ભમાં રજૂ કરી એમાંની નિર્માલ્યતાને વેધક બનાવે છે. અર્જુનના વાયુરથ અને પાંચાલીના રૂપક દ્વારા એનું નિદાન સૂચવે છે. આ આલેખનમાં ગોવર્ધનરામે વર્તમાન સમાજનો રોગ પારખી એનો જે ઈલાજ બતાવ્યો છે એ ખરેખર આવકારદાયક છે. આપણે ગુમાવેલા ભૂતકાળના ભવ્ય વારસાની પુનઃ પ્રાપ્તિ માટે લેખકને સખત પરિશ્રમની જરૂર જણાય છે.

સમાજમાં સ્ત્રીઓના હલકા દરજ્જા માટે તેમને ભારોભાર વ્યથા છે. સમાજજીવનમાં સ્ત્રીના મહત્ત્વને તેઓ સ્વીકારે છે. સ્મૃતિકારોએ બનાવેલી સ્ત્રી–સન્માનની ભાવનાને તેઓ બિરદાવે છે અને 'न स्त्री स्वातंत्र्यमर्हति' એ શ્લોકપંક્તિનું આગવી રીતે અર્થઘટન કરે છે. સમાજમાં કુમારિકા અને વિધવાના સ્થાન અંગે તેમણે વિવિધ દૃષ્ટિકોણથી તપાસ કરી છે. કુમારિકાઓ, વિધવાઓ અને પરિવ્રાજિકાઓ માટે કલ્યાણગ્રામની યોજનામાં યોગ્ય વ્યવસ્થા તેમણે સૂચવી છે. પશ્ચિમના સમાજે કુમારિકાઓને સ્વીકારી છે, તો આપણા સમાજે વિધવાઓને સ્વીકારી છે. વૈધવ્યને તેઓ પવિત્ર માને છે. પુખ્ત વયે સ્વપસંદગીથી કે વડીલોની મદદથી પાત્રોને સ્વીકાર્ય હોય એવાં લગ્ન થાય તો વિધવાપુનર્લગ્નનો પ્રશ્ન જ ઉપસ્થિત ન થાય. તેઓ સ્ત્રી સ્વાતંત્ર્ય માટે હિમાયત કરે છે. સમાજમાં યોગ્ય વાતાવરણ તૈયાર થયું ન હોવાથી કુમુદના પુનર્લગ્ન માટેનું અને કુસુમને કુમારિકા રહેવા દેવાનું પગલું તેઓ ભરતા નથી ત્યાં એમના વ્યવહારમાં કેટલાકને મર્યાદા પ્રતીત થાય એ સ્વાભાવિક છે. સમાજમાં જેનાથી સંઘર્ષ પેદા થાય કે પોતાને તેના કારણરૂપ બનવું પડે એવું પગલું ભરવાની તત્પરતા તેમનામાં નથી એમ કહી શકાય. સમકાલીન સમાજ–સુધારકોએ જ્ઞાતિબંધન ફગાવી દેવા હિમાયત કરી છે પરંતુ ગોવર્ધનરામ આ બાબતમાં એમનાથી જુદા પડે છે. એક બાજુએ, તેઓ સમાજવ્યવસ્થા માટે અનન્ય અને પ્રગવિશીલ વિચારો આપે છે, તો બીજી બાજુએ, તેના અમલ દ્વારા સમાજને આંચકો આપવા તેઓ તૈયાર થતા નથી. હું માનું છું કે કોઈ પણ બાબત અંગે નિર્ણય કરવાની એમની આગવી પદ્ધતિ આ માટે જવાબદાર છે.

કલ્યાણગ્રામની યોજના દ્વારા એમણે સમાજ સમક્ષ એક આદર્શ મૂક્યો છે. ભાવિ સમાજ માટેનું આ એમનું કાન્તદર્શન (Vision) છે. તેઓ આશાવાદી છે તેથી આજે તે શક્ય ન બને તો યુગો પછી પણ એને હાંસલ કરી શકાય એવો આશાવાદ તેઓ સેવે છે. ક્રમિક રીતે એ પાયા પર સમાજની ઈમારત ઊભી થાય તો રામરાજ્ય (Utopia) સ્થાપી શકાય એવી એમની માન્યતા છે. ગોવર્ધનરામનું આ કાન્તદર્શન એમને આધુનિક યુગના ઋષિનું શિરોદ અપાવે છે.

સંસ્કૃત સાહિત્યમાં નલકથા–એક અધ્યયન

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पुण्यश्लोको नलो राजा पुण्यश्लोको युधिष्ठिरः ।
पुण्यश्लोका च वैदेही पुण्यश्लोको जनार्दनः ॥

સંસ્કૃત સાહિત્યના વાઙ્મયમાં કથાઓનું અદ્વિતીય સ્થાન છે. રામકથા, કૌરવો–પાંડવોની કથા, શિબિની કથા, સત્યવાન–સાવિત્રીની કથા, ઉદયનકથા, પુરુરવા–ઉર્વશીની કથા ઇત્યાદિ અનેક કથાઓની જેમ નલકથા પણ અત્યંત પ્રસિદ્ધ એવી કથા છે. આ કથાઓ સર્વ સાધારણ જન માટે હિતકારક, ઉપદેશાત્મક તથા પ્રેરણાત્મક છે. નલકથામાં પુણ્યશ્લોક નલ તથા દમયંતીના પાત્રો દ્વારા પતિ–પત્નીએ એકબીજાનાં સુખદુઃખમાં કેવી રીતે ભાગીદાર બની સાથ આપવો જોઈએ, તેનું પ્રતિપાદન કરવામાં આવ્યું છે. આમ પ્રાચીન ભારતીય સંસ્કૃતિ અને સભ્યતાની સમજ માટે, અભ્યાસ તથા પરિચય માટે નલકથાને મહત્ત્વની ગણાવી શકાય.

સંસ્કૃત સાહિત્યનો ઇતિહાસ બતાવે છે કે સંસ્કૃત સાહિત્યમાં નલકથા વિષયક અનેક ગ્રંથોની રચના થયેલી છે, આ રચના થવાનું કારણ નલકથાનો નાયક નલ પુણ્યશ્લોક છે, તથા પોતાનાં ગુણો, લક્ષણો, રૂપ, શીલ તથા કાર્યો વડે સ્વર્ગના દેવોની પણ સ્પર્ધા કરી શકે એવો છે, એમ કહી શકાય. તદુપરાંત નલકથા એ અત્યંત રોચક તથા રસપ્રદ કથા છે જે પાઠકને આદિથી અંત સુધી કુતૂહલ તથા રસ ઉત્પન્ન કરીને, આકૃષ્ટ કરીને જકડી રાખે છે. વિશેષતઃ સંસ્કૃતમાંથી ઊતરી આવેલી ભાષાઓમાં પણ નલકથા વિષયક ગ્રંથોની રચના થયેલી છે, એ જ નલકથાની પ્રસિદ્ધિ તથા વ્યાપકતા બતાવે છે.

પ્રાચીન સમયથી શતપથ–બ્રાહ્મણથી નલકથા વિષયક અનેક ઉલ્લેખો પ્રાપ્ત થાય છે. પરંતુ સર્વ પ્રથમ નલકથા વિસ્તૃત રીતે મહાભારતના નલોપાખ્યાનના રૂપમાં જ પ્રાપ્ત થાય છે. તેથી મહાભારતના નલોપાખ્યાનને મૂળ નલકથા તરીકે આ મહાનિબંધમાં લીધી છે. આ મહાભારતની નલકથા સંસ્કૃત સાહિત્યમાં કેવી રીતે આગળ વધી છે, અન્ય પરવર્તી ગ્રંથકારોએ મહાભારતની નલકથામાં કયા ફેરફારો કર્યા છે અને એ ફેરફારો શા માટે કર્યા હશે એનું વિવેચન આ મહાનિબંધમાં કરવામાં આવ્યું છે. આ વિવેચન તથા યોગ્યાયોગ્ય પરિવર્તનો સાથે નલકથાનો વિકાસ કઈ રીતે સધાયો એ પ્રસ્તુત મહાનિબંધમાં સમાવિષ્ટ કર્યું

છે. આમ છતાં આપણને જાણવા મળે છે કે અનેક સદીઓ પસાર થવા છતાં મૂળ નલકથાનું હાર્દ અર્વાચીન સમય સુધી એનું એ જ રહ્યું છે.

આ પ્રબંધમાં સંસ્કૃત સાહિત્યમાં ઉલ્લેખાયેલ વિભિન્ન નલો, નલકથાનું મહત્ત્વ, નલકથા વિષયક ગ્રંથકારોનાં જીવન, સમય, કવન તથા વિશેષતાઓનો પરિચય અને મહાભારતની નલકથા સાથે, અન્ય નલકથા વિષયક ગ્રંથોનું સામ્ય તથા પરિવર્તનોનું મૂલ્યાંકન વિસ્તૃત રીતે કરવામાં આવ્યું છે.

આ પ્રબંધની યોજના– ૧. પ્રાસ્તાવિક પ્રકરણ અને વૈદિક સાહિત્યમાં નલકથા. ૨. મહાભારત અને રામાયણમાં નલકથા ૩. પુરાણોમાં નલકથા ૪. મહાકાવ્યો ૫. અન્ય કાવ્યો ૬. ચંપૂ ૭. નાટકો ૮. ઉપસંહાર – આ રીતે આઠ પ્રકરણોમાં કરી છે. તદુપરાંત નલકથાનું રામકથા તથા વિરાટપર્વની કથા સાથેનું સામ્ય, અક્ષ અને કલિ–નલ સંબંધ તથા નલકથાનું પ્રતીકાત્મક સ્વરૂપ – આ વિષયોનું યથાશક્તિ વિવેચન કરવાનો પ્રયત્ન કર્યો છે.

સંસ્કૃત સાહિત્યમાં નલકથા વિષયક અનેક ગ્રંથોની રચના થએલી હોવા છતાં અનેક સ્થળોએ પ્રયત્ન કરવા છતાં પ્રત્યેક ગ્રંથો ઉપલબ્ધ થઈ શકયા નથી. કેટલાક પ્રાપ્ય ગ્રંથો પ્રાપ્ત કરવાની મુશ્કેલીઓ પણ હતી. છતાં સર્વ પ્રાપ્ય ગ્રંથો પ્રાપ્ત કરીને તેનું અવલોકન આ પ્રબંધમાં કર્યું છે

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